ICE AND Refrigeration

PUBLISHED BY NICKERSON & COLLINS CO., CHICAGO - NEW YORK

58th YEAR ★ AUGUST, 1949

More cold...

View of the Marinovich Ice & Cold Storage Co. plant at Watsonville, Calif. The horizontal ammonia compressors are being successfully lubricated with *Texaco Capella Oil "D"*.

Raise compressor efficiency, keep coils clean, by using Texaco Capella Oils

...Less cost

COMPRESSORS deliver maximum refrigeration tonnage . . . require fewer overhauls and less servicing . . . when lubricated with *Texaco Capella Oils*. This is because these carefully refined oils keep both compressors and coils clean.

Texaco Capella Oils have exceptional resistance to the formation of carbon, gum and sludge, thus assure clean, efficient compressor operation. They assure clean coils because they do not react with refrigerants. They are moisture-free and have very low pour tests.

For maximum efficiency and economy in your compressor operation, use the *Texaco Capella Oils* recommended for your particular compressors and operating conditions. A Texaco Lubrication Engineer will gladly assist you.

Call the nearest of the more than 2300 Texaco Wholesale Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TEXACO Capella Oils

FOR ALL AIR CONDITIONING AND REFRIGERATING EQUIPMENT

TEXACO

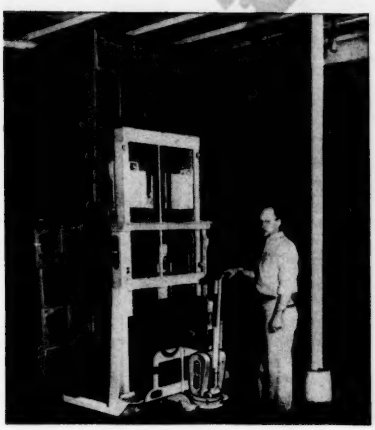
ICE AND REFRIGERATION, Vol. 117, No. 2. Published monthly at 433 N. Waller Ave., Chicago, Ill., U.S.A., by Nickerson & Collins Co. Yearly subscription in the U. S., $3.00 per year; other countries, $4.00. Single copies, 35 cents. Copyrighted 1949 by Nickerson & Collins Co. Entered as second-class matter August 8, 1891, Chicago, Ill., under the Act of March 3, 1879. Additional entry at Beloit, Wisc.

FOR REAL PAYOFF
INVEST IN MOTO-TRUCS

Moto-Pallet Truck

This truck has Patented Nydegger Shackles on load wheels, which insure smooth travel onto elevators and over uneven floors, etc.

The Shorter Trucks with Important Advantages



Moto-Telescopic Hi-Lift Truck

3,000 lb. capacity, 80" lift, fully extended. 66" collapsed position. Operates in a six foot aisle with a 36"x48" pallet. Patented articulating hinged spring unit holds drive wheel down for better traction. Made to handle any type and size of pallet.

• ADVANTAGES IN LENGTH.

Moto-Trucs are up to 15" shorter in overall length due to a more compact power unit. They operate in less aisle space and permit more space for storage.

• ADVANTAGES IN CONTROL.

Moto-Trucs have by far the simplest and most convenient controls. You get two speeds forward and two reverse by an easy turn of the wrist on roller type handle. Push buttons in ends of handle control the hydraulic lift.

• ADVANTAGES IN SAFETY.

Moto-Trucs have dead-man controls, time proven for dependability, and other safety features which protect both operator and loads.

• ADVANTAGES IN LOW COST OPERATION.

Moto-Trucs operating cost is low. You can keep these trucks busy for as little as 8c per 8-hour day.

• ADVANTAGES IN MOTOR ACCESSIBILITY.

Moto-Trucs have an interchangeable power unit which is easily accessible for inspection. The entire unit can be removed and replaced in from 15 to 30 minutes.

• ADVANTAGES IN CONSTRUCTION.

Moto-Trucs are ruggedly built for dependability and unusually low maintenance cost. They are an investment that will last for years.

WRITE FOR BULLETIN NO. 49

YOU TOO, CAN SIT BACK AND RELAX —

when you have installed a

MARTOCELLO AIR SYSTEM!

YES, YOUR WORRIES ARE OVER, BECAUSE MARTOCELLO CLEAR RAW WATER AIR AGITATION SYSTEMS MEAN CLEANER, CLEARER, AND MORE SANITARY ICE

REMEMBER YOUR REFRIGERATION SYSTEM MAKES ICE —BUT YOUR AIR SYSTEM SELLS IT

SO DON'T BE SATISFIED UNLESS IT'S

"NOTHING BUT THE BEST"

NORTH, EAST, SOUTH or WEST

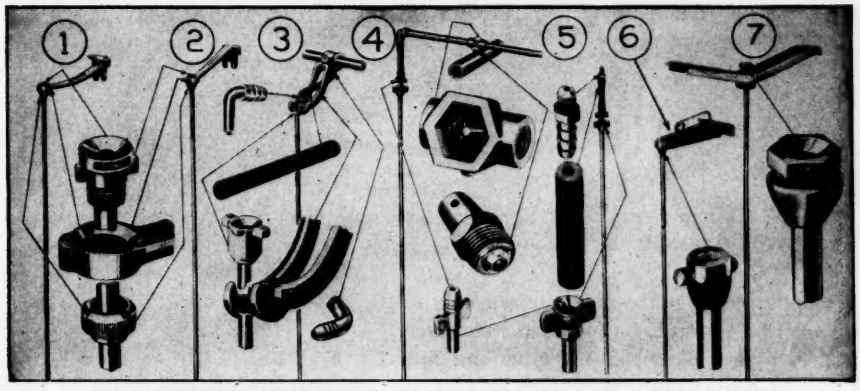
all points lead to

Martocello

Known the World Over

For it's fine quality products and

AIR AGITATION SYSTEMS



THE ILLUSTRATION ABOVE SHOWS THE FOLLOWING CLEAR ICE MAKING SYSTEMS

1. MARTOCELLO SELF-CENTERNG DROP TUBE BRACKET, Offset Form
2. MARTOCELLO SELF-CENTERNG DROP TUBE BRACKET, Straight Form
3. MARTOCELLO SERIES DROP TUBE BRACKET
4. DOUBLE BRACKET SYSTEM ASSEMBLY
5. SERIES DROP TUBE ASSEMBLY
6. GALVANIZED STEEL TRUNNION TYPE BRACKET ASSEMBLY
7. GALVANIZED STEEL SADDLE BRACKET ASSEMBLY

FOR PROMPT EFFICIENT SERVICE — PHONE, WIRE OR WRITE TODAY!

Represented on the West Coast by Western Ice Equipment Co., 420 Market St., San Francisco, Calif.

Jos. A. Martocello & Co. 229-231 NORTH 13th STREET PHILADELPHIA 7, PA.

"Serving the Ice Industry Since 1916" . . *"There is no Substitute for* MARTOCELLO QUALITY"

A NEW REFRIGERATION CONDENSERS BOOKLET BY Vogt

Write FOR BULLETIN RC-1

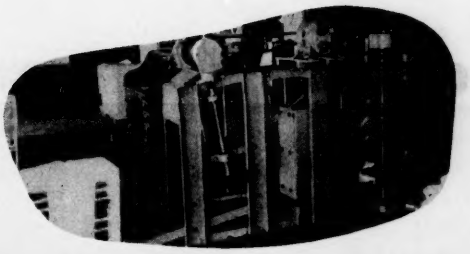
Here's pertinent, up-to-the-minute information on our complete line of refrigeration condensers . . . a 24 page booklet showing types and sizes designed to deliver low temperature liquid with the lowest condensing pressure.

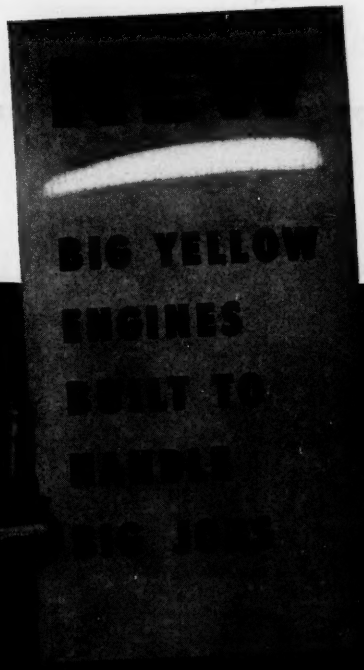
Vogt Refrigeration Condensers are fabricated from top quality plates, tubes, pipes, forgings, and castings by skilled workmen in modernly equipped shops. Units are designed, tested and stamped to A.S.M.E. Code requirements.

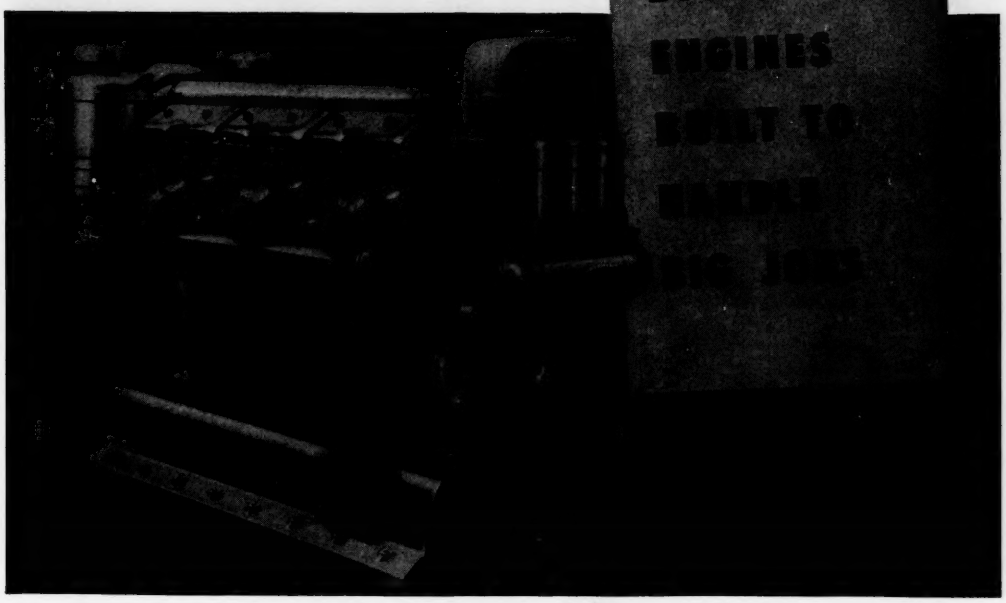
Vogt FOR BETTER REFRIGERATION

HENRY VOGT MACHINE CO., LOUISVILLE 10, KY.

BRANCH OFFICES: NEW YORK, PHILADELPHIA, CLEVELAND, CHICAGO, ST. LOUIS, DALLAS







THE 500-hp. D397—BIGGEST OF THE NEW "CAT" DIESELS

Ice and refrigeration men in every region have learned from long experience that they can always depend on "those big yellow 'Cat' Engines and 'Cat' Electric Sets."

In addition to present models are four great new "Cat" Diesels ranging up to 500 horsepower and four new Electric Sets generating up to 314 kilowatts. They are being built in the world's finest and most modern engine factory. Every one is built for utmost stamina and long life—and to burn low-cost, non-premium fuels. Each is given a closely supervised dynamometer run to assure proper break-in and full horsepower output.

The new, bigger "Caterpillar" Diesels offer you more power for your bigger refrigeration compressors and ice-making machinery. When buying new equipment, or when repowering your present plant, call your reliable "Caterpillar" dealer.

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MOTOR GRADERS
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Address_____

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PALCO INSULATION WOOL

CUTS COSTS, SAVES PRODUCE

WITH THERMAL CONDUCTIVITY OF ONLY .255 BTU

Above: Daily capacities include quick freezing of 70 tons of produce, manufacture of 70 tons of ice at the recently enlarged Union Ice Company Plant at Santa Cruz, California. PALCO WOOL is the primary insulating material.

Right: Part of the 242,000 cu. ft. frozen food holding room area at the Santa Cruz Union Ice Company Plant, which also maintains storage rooms for 500 tons of ice and 600 frozen food lockers.

In ALL low temperature insulation, efficiency is the important factor in maintaining profits. Impartial tests and service records prove that PALCO WOOL is one of the most efficient insulations known. Made from naturally fire resistant Redwood bark, it is "Saferized" to make it permanently flame-proof. Moisture-resistant, non-settling, non-deteriorating, odorless, odor-proof, PALCO WOOL is the ideal low temperature insulation. Investigate before you insulate.

Write today for the PALCO WOOL COLD STORAGE MANUAL *or the* LOCKER PLANT PLAN *and* CONSTRUCTION MANUAL

FLAMEPROOF INSULATION FROM DURABLE REDWOOD BARK

THE PACIFIC LUMBER COMPANY

100 BUSH STREET, SAN FRANCISCO 4, CALIFORNIA

5225 WILSHIRE BLVD. LOS ANGELES 36, CALIF. • 35 E. WACKER DRIVE, CHICAGO 1, ILL.

"We Insist on Packaged Processed Ice to Prevent Contamination"

SAYS E.T. LEMONIS, MANAGER, MOHICAN HOTEL, NEW LONDON, CONN.

The Mohican Hotel (New London, Conn.) is a focal point for local people as well as transients, and widely patronized for banquets and special parties.

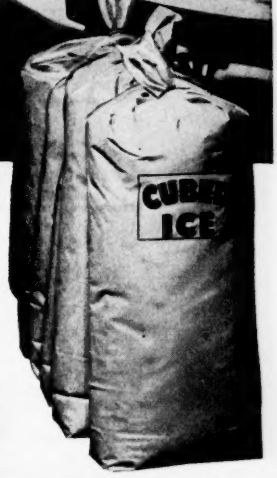
It's Easy to Get New Business With the One-Trip Paper Ice Bags

SANITATION is the first consideration of all who sell food. It's so important that many hotels, restaurants and stores prefer to invest in expensive ice-processing equipment rather than take a chance with old-fashioned returnable open-top containers.

Here's an idea to win new customers and hold old ones! Deliver processed ice in Union One-Trip Paper Ice Bags that bar all chance of dirt and contamination.

You sell more ice in one-trip paper bags, too, for consumers do their own icing and always use more. You speed up handling on the platform, in loading and at the delivery point! And the sturdy wet-strength paper—two layers thick—retards melting.

More ice companies every month are building more business with Union Paper Ice Bags. Join the parade. Write for free samples.



Wet-Strength Paper Ice Bags have tremendous strength even when soaking wet...thanks to a water repellent resin that binds the fibres of the paper firmly together.

ONE TRIP

UNION Paper Ice Bags

A product of the UNION BAG & PAPER CORPORATION • Woolworth Bldg., New York 7, N. Y.

Bags of Kraft, Transparent Films, Waxed Paper, Glassine, Laminates

The *DEMAND* Is for QUALITY ICE

For Ice That Will Not Produce Slime In Ice Boxes...

Use DISTILEX This Way...

Dispense with Soda Ash, Sodium Aluminate, Alum and Similar Products . . . and

SIMPLY MIX DISTILEX WITH THE LIME YOU ARE NOW USING!

Block on left treated with Distilex, only one core emptied. Right, untreated water, cores were emptied twice. Most Distilex users do not empty cores at all.

***RESULT** . . . .* High-grade Crystal Ice from raw water . . . Ice free from slime and deposits . . . Ice without color, odor, taste . . . Ice which can be produced at very low temperature* with no cracking while being frozen, dumped or cut.

***DISTILEX** treated water can make Ice in LESS THAN 35 HOURS at 10° brine temperature!

Test DISTILEX in your plant. If not entirely satisfied, purchase price will be refunded on all DISTILEX returned. $25.00 per 100 lbs., f.o.b. Birmingham.

Use SOLVEX for COMPRESSOR COOLING SYSTEMS

HIGH HEAD PRESSURES QUICKLY LOWERED with this remarkable chemical. SOLVEX can be quickly applied without breaking a joint. REMOVES RUST, SCALE, ALGAE, OIL AND ENCRUSTING MATTER from condenser tubes and water jackets in one to five days operation. Ideal for cleaning scale and corrosion from boilers, heaters and tanks.

An effective conditioner for spray ponds and cooling towers. SOLVEX goes to work immediately WITHOUT COSTLY SHUTDOWNS. Cooling efficiency is rapidly restored by using one pound per 10 gallons of waier.

Write NOW for Further Particulars on These MONEY-SAVING AIDS TO BETTER ICE MAKING!

The CSCO STABLEIZER MAINTAINS GOOD BRINE by a positive reaction to either OVER-ACIDITY or OVER-ALKALINITY!

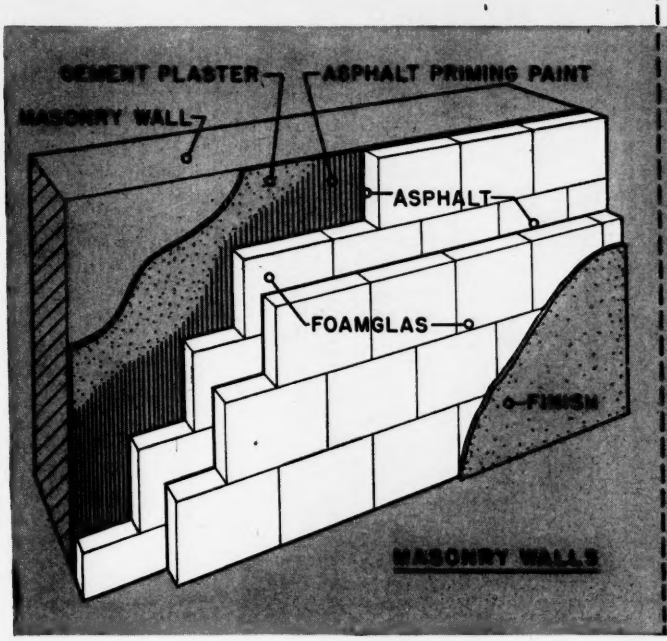
A scientific combination of pure metals upon which damaging materials in brine will "feed" in preference to the brine tank or ice cans, thereby SAVING them!

the CSCO STABLEIZER removes destructive material from the brine without adding harmful chemicals. Easily installed in all systems. No other brine treatment compares in SAFETY! The STABLEIZER does not make brine harmful to workmen's hands. PROTECTS AND PRESERVES EXPENSIVE EQUIPMENT!

CHEMICAL SOLVENT COMPANY

3005—16th Street North — Birmingham, Ala.

FOR ECONOMICAL REFRIGERATION—

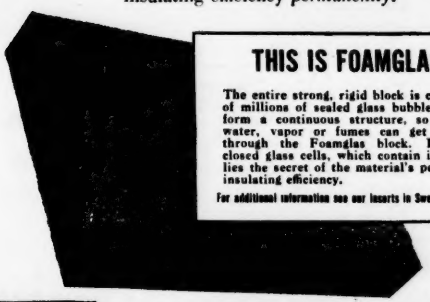


Get this permanent insulation

● PC Foamglas is frostproof, acidproof, vaporproof. So Foamglas, which has all the insulating qualities needed for effective refrigeration, also is impervious to elements which cause other materials to lose insulating efficiency. When installed according to our recommendations and specifications, PC Foamglas retains its original insulating efficiency *permanently*.

In walls, floors, ceilings and on roofs of cold storage buildings, PC Foamglas withstands humidity, minimizes condensation and helps to maintain desired low temperatures. Freedom from repairs, maintenance and replacements, combined with the above properties, makes PC Foamglas the truly economical insulation for refrigeration.

Our insulating specialists will be glad to help you work out your individual insulating problems, to show you where and how you can use Foamglas to the best advantage for refrigerated space. Meanwhile, why not send the convenient coupon for a free copy of our latest folder? We shall be glad to mail it at once.



THIS IS FOAMGLAS®

The entire strong, rigid block is composed of millions of sealed glass bubbles. They form a continuous structure, so no air, water, vapor or fumes can get into or through the Foamglas block. In those closed glass cells, which contain inert air, lies the secret of the material's permanent insulating efficiency.

For additional information see our inserts in Sweet's Catalogs

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Please send me without obligation, your FREE folder on the use of PC Foamglas Insulation for refrigerated space.

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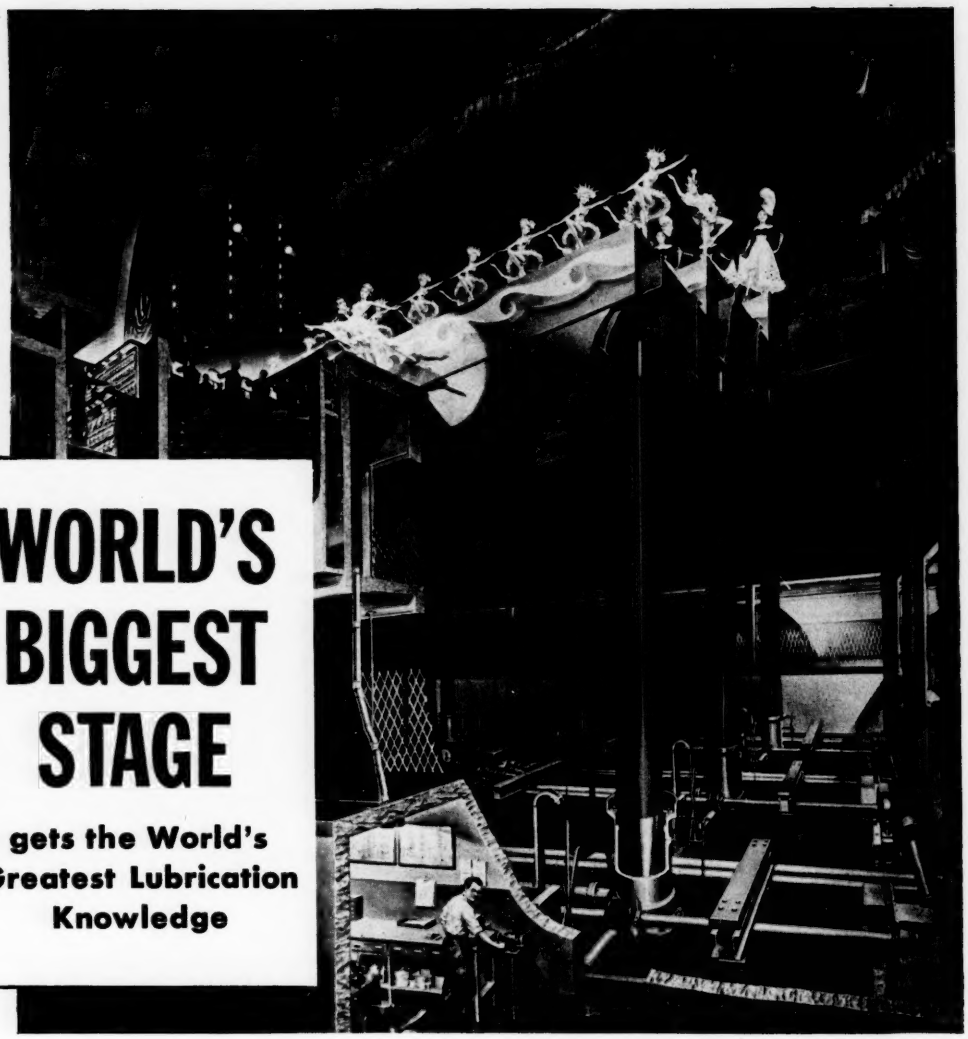
FOAMGLAS INSULATION

. . . when you insulate with FOAMGLAS . . . you insulate for good!



WORLD'S BIGGEST STAGE

gets the World's Greatest Lubrication Knowledge

You've seen it in New York—the great 10,000 sq. ft., 190-ton stage at Radio City Music Hall. You've seen it split into sections, display scenes at different levels and even change scenes completely in the twinkling of an eye.

It's done with giant 57-ft. hydraulic plungers, a circular turntable and other mechanical marvels, all lubricated by Socony-Vacuum. Ever since this great entertainment center opened 16 years ago, Socony-Vacuum has supplied famous Gargoyle lubricants and skilled engineering service to keep the show going—special greases for the plungers, gear racks and motors and the right oils for the heating and air-conditioning equipment.

You can get this same lubrication knowledge to keep the show going in your plant. See your Socony-Vacuum Representative.

SOCONY-VACUUM

GARGOYLE Lubricants

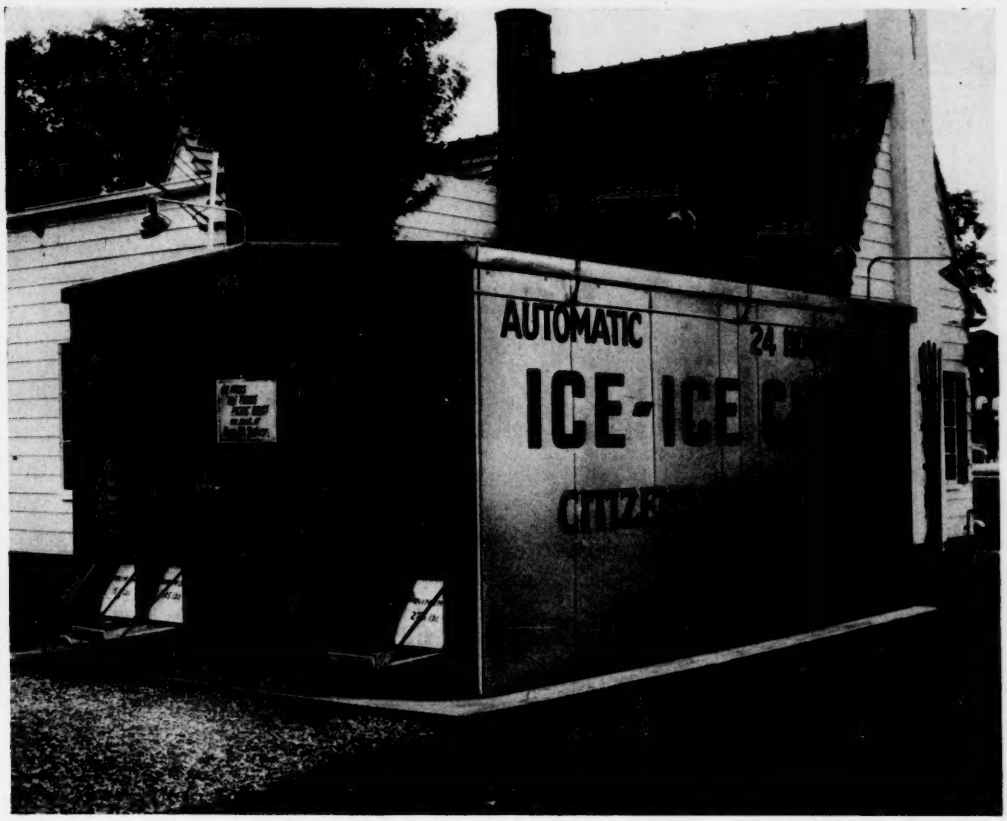
Rely on

SOCONY-VACUUM

Correct Lubrication

SOCONY-VACUUM OIL COMPANY, INC., and Affiliates: MAGNOLIA PETROLEUM COMPANY, GENERAL PETROLEUM CORPORATION

Another **POLAR** INSTALLATION . . .
SELLING MORE ICE —*Automatically!*



Owners **OF POLAR ALUMINUM REFRIGERATED ICE STATIONS** ***Report***—

INCREASED ICE SALES . . .
GREATER PROFIT AT
LOWER DISTRIBUTION COSTS!

You, too, can sell more ice to more people, for more profit, by merchandising ice in automatic, coin-operated Polar aluminum ice vending stations.

The Polar station attracts customers . . . has ample storage space . . . vends blocks or cube ice automatically. The Polar station is a dependable salesman who will work for you 24 hours a day, every day, year after year!

THERE'S EXTRA VALUE IN POLAR ICE VENDING STATIONS!

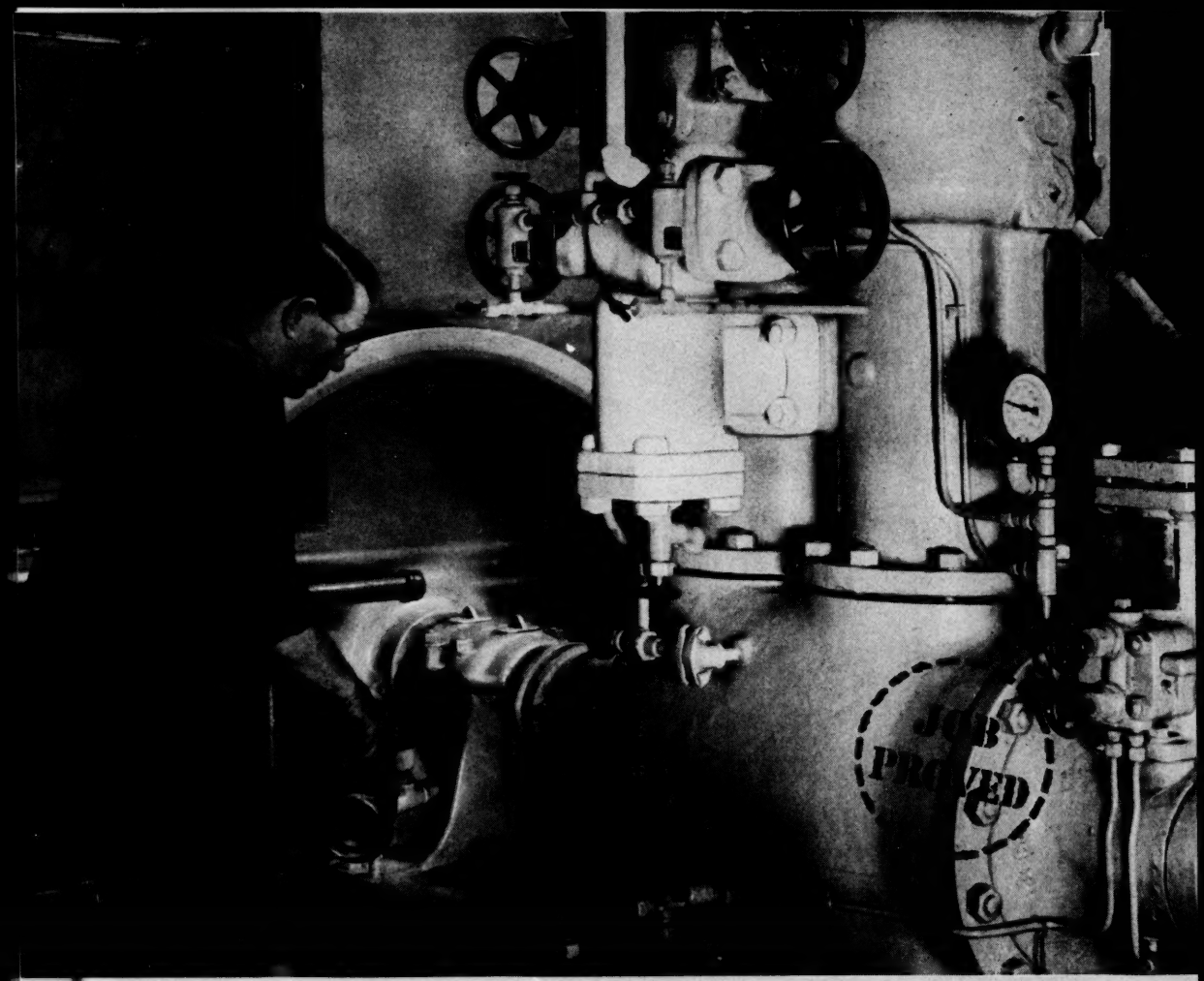
check these outstanding features—

- **AIRCRAFT ALUMINUM CONSTRUCTION**
- **COIN MECHANISM THAT ADDS CHANGE**
- **HEAVY DUTY REFRIGERATION UNIT**
- **24 HOUR AUTOMATIC SERVICE**
- **LOW OPERATING COST**
- **LOW UPKEEP**

Write today for free Polar Catalog

REFRIGERATION ENGINEERING COMPANY

211 Foshay Tower *"Pioneers in Refrigeration"* **Minneapolis 2, Minn.**



13 YEARS OF SMOOTH OPERATION

Sun Refrigeration Oil Reduces Compressor Maintenance 20%, Eliminates Sticky Valves and Carbon Deposits

A creamery operating four big ice machines was having trouble with sticky valves and deposits of hard carbon. Then, 13 years ago, a change was made to a Sun lubricant. Subsequent records show that compressor maintenance costs have been reduced 20 percent.

Trouble with sticking valves and hard carbon has been largely eliminated. Main bearings last longer. Oil costs are substantially lower.

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"Job Proved" Sun oils are first choice of refrigeration engineers. Manufacturers of refrigeration equipment probably use more Sun refrigeration oils than the total of all others.

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J. F. NICKERSON, Founder

Published First of Each Month by

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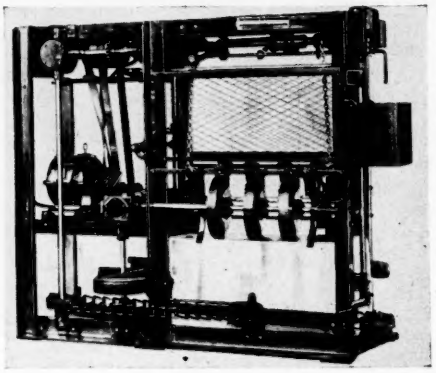
HEAVY-DUTY SCORING MACHINE



The Perfection made MILLER

Scoring Machine is the lowest priced, completely automatic, Heavy-Duty Ice Scoring Machine on the market. Hundreds of MILLER machines are in use all over the country and have been for many years.

Like all other Perfection products, the MILLER is sturdy, fast, economical in operation and maintenance.

IMMEDIATE DELIVERY!

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IN THIS ISSUE —

Moisture in Walls Of Cold Storage Rooms

Over a period of the last several years, Carl Munters of Sweden, co-inventor of the Electrolux gas refrigerator, has carried on studies of the effect of moisture in insulated cold storage walls. Recently a full report on these studies was prepared by Mr. Munters, a summary of which is given in the article on page 17.

Freezing Eggs In the Shell

A new method of freezing eggs in the shell has been developed in a laboratory of the Louisiana State University, Baton Rouge, by Socrates A. Kaloyeras. In the article on page 19 Mr. Kaloyeras tells how this process was developed and some of its uses and advantages.

Costs Reduced When Ice Plant Modernizes

An interesting demonstration of how costs can be reduced through installation of modern machinery is provided by the experience of the Spears & Miller ice plant at El Paso, Tex. The story of this modernization is told on page 21 by the manager of the plant.

Disastrous Fire Damages Utah Ice & Storage Plant

A fire swept one of the Utah Ice & Storage plants in Salt Lake City June 28, causing more than a million and a quarter dollars property loss and destroying the large refrigerated storage building. Details of the fire and pictures are on page 23.

Trends of Refrigeration In Great Britain

A year as engineer-scientist for the U. S. Department of State in Great Britain and Europe gave Dean W. R. Woolrich an insight on refrigeration developments overseas. Research and investigation have continued at a good pace while many problems of production remain to be solved. He describes the situation and gives much information of interest on page 39. It is apparent that we are quite fortunate to have such a good domestic market for refrigerating equipment which no other country now enjoys.

Crushed Ice in Bags Keeps Vegetables Fresh

Crushed ice in bags is now being used by an eastern vegetable shipper to keep prepackaged vegetables fresh when packed in shipping cartons. The bags, filled with crushed ice, are placed between the vegetable packages. Full discussion and description of the new method, with picture of packing operation is given in the article on page 24.

Refrigerator Car Icing Plant

A large refrigerator car icing plant, where 300 cars can be serviced daily is operated by the Pacific Fruit Express at Roseville, Calif. On page 26 a series of pictures tell the story of this icing operation.

Three Purpose Refrigerating Plant

A new ice making and refrigerating plant has been opened by the Terminal Ice & Cold Storage Co. at Nampa, Idaho. It produces up to 500 tons of ice daily, furnishes refrigeration to a quick freezing system, and maintains temperatures in a large refrigerated warehouse. For illustrated description of this plant see page 29.

1948 Ice Sales

Total ice sales in the United States during 1948 amounted to 46,990,212 tons, according to a survey by the National Association of Ice Industries. Although this was a decrease over 1947, sales of processed ice increased. Detailed figures on total sales and processed ice sales are given on page 31.

Frozen Food Locker Convention

The tenth annual convention of the Frozen Food Locker Association will be held at the Stevens Hotel, Chicago, August 28 to 31. A number of new features, contests and demonstrations are planned. The program is outlined in the article on page 55.

Shipments of Air Conditioning Equipment

Shipments of air conditioning equipment and components and accessories for air conditioning and commercial refrigeration equipment during 1948 were valued at $216 million, a decrease of eight per cent from 1947. The summarized report issued by the Bureau of the Census is published on page 57.

TO CUT HANDLING COSTS SAVE TIME SAVE LABOR — WHEN YOU STORE ICE

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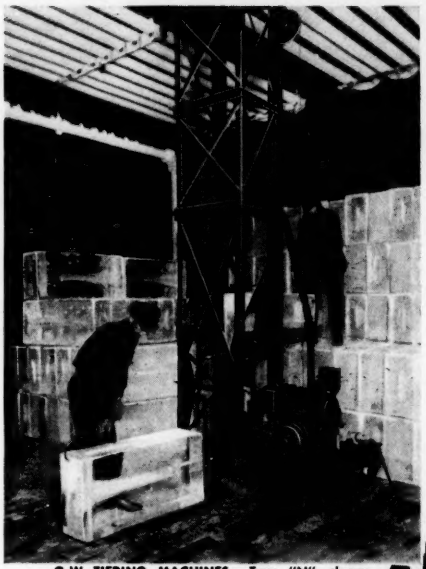
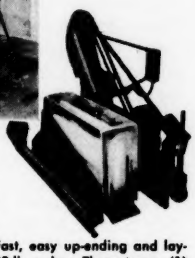


G-W TIERING MACHINES — Type "N", shown, will stack 300 or 400-lb. cakes up to ten tiers high, safely, quickly, economically. Electrically operated, this portable unit is equipped with convenient, visual tier finder and push button control. Write for Bulletin No. 451.



G-W UP-ENDERS — Fast, easy up-ending and laying down of 300-400-lb. cakes. Three types: (1) Full automatic; for use with storage room conveyors. (2) Automatic unit with adjustable discharge; up-ends and elevates cake to platform or skid in one operation. (3) Semi-automatic; for up-ending and lowering cakes; lift-about device gives unit portability. Write for Bulletin No. 487.

It's more profitable to handle ice for storage with G-W equipment. Conveyor speeds cakes from tank room to storage room, without manual handling — Up-Ender eliminates manual lifting to platform levels — Portable Tiering Machine stacks cakes fast, where you want them — Ice Tools assist where needed. Install this dependable combination in your plant and you've got big savings in time, labor . . . and handling costs. Write for Bulletins describing and illustrating these efficient Gifford-Wood machines, today.

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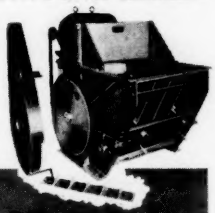

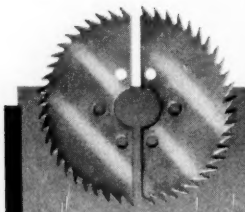

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Moisture In Walls Of Cold Storage Rooms

By Carl Munters

NUMEROUS laboratory investigations have been made to study the effect of moisture in insulated walls. Relatively few of these studies, however, have concerned themselves with the theoretical aspects of the problem or with the problems of cold storage walls as distinguished from conventional refrigerator walls. In contrast, it is the purpose of this paper to present the theoretical studies which have been carried on by the author over a period of the last several years and which have been augmented by both a sizeable laboratory testing program and full scale tests on actual cold storage warehouses.

More than 20 years ago Carl Munters of Sweden was co-inventor of the Electrolux Gas Refrigerator. During the past 15 years he has directed his engineering knowledge toward investigation of insulations and their application in low temperature work. In June he presented a paper to the 36th Spring Meeting of the American Society of Refrigerating Engineers which recounted his studies on moisture problems and described remedies he recommends. This article was extracted from the paper Mr. Munters presented.

In connection with his investigation in this field, Mr. Munters developed an insulation made of asphalt impregnated corrugated paper which has been used in numerous cold storage structures in Europe for some 10 years. A plant in South America has also been producing and distributing the insulation in that territory.

In cold storage walls, moisture can transfer from the air outside the building through diffusion, and condense at the lower temperatures prevailing in the wall structure. Water can in this way be accumulated in considerable quantities with a resulting increase in the thermo conductivity of the insulating material, and even risk the existence of the wall. Protecting barriers of asphalt are often used in order to prevent moisture from penetrating into the wall from the outside air. It is impossible to obtain a hermetically tight wall by this construction. A certain quantity of vapor will pass the protecting barrier every unit of time. If condensation and collection of water are to be avoided, this vapor must leave the insulation as rapidly as it penetrates into the material and in such a way that its pressure in no section of the wall will reach the saturation point.

In domestic refrigerators, this is possible to arrange. Only a small quantity of vapor will in this case pass the outer shell of sheet metal, which is carefully sealed against the outside air, and this quantity will easily be disposed of into the air inside the box, as the inner lining is not sealed in a corresponding way. The vapor pressure in the wall will, therefore, be very nearly the same as the vapor pressure in the inside air, and consequently, no risk of condensation exists where the temperature in the walls is higher. In cold storage walls it is more difficult to obtain the same result. The resistance in the inner lining to the passage of vapor is too large in comparison with that of the asphalt barrier. The vapor pressure in the wall can, therefore, not be kept under the saturation point.

In examining existing cold storage walls in Sweden and Europe, we have been amazed at the extent to which water has collected. This has often caused an increase of heat transmission loss of as much as 80 to 120 per cent. In cold storage warehouses these losses are estimated to equal 30 to 70 per cent of the entire refrigerator load with walls in a dry condition. The result of this can interfere catastrophically with the maintenance of temperature as well as on the operating costs of the warehouse.

The processes by which moisture from the air enters various insulating materials were described by Mr. Munters. He analyzed the theories governing this hygroscopic activity and presented calculations to demonstrate the extent to which insulations will take up and hold water under various conditions and in different types of insulated structures.

The influence of moisture content on the thermal conductivity (k) of the insulation was analyzed. Data was given to show the influence of free water in various insulations and materials on their thermal conductivity.

A number of diagrams were presented to show the moisture vapor pressure gradient in different types of cold storage wall structures and a method was presented for calculating the risk of moisture condensation in these walls.

Removal of Moisture by Air Circulation

It is difficult to provide an inner wall coating which has sufficiently low moisture resistance to allow moisture to pass through it from the insulation into the room. The author points out that this desirable effect can be accomplished by providing circulating channels in the insulation in the walls, floors and ceilings and by providing openings which will permit the moisture vapor to be transmitted into the low temperature space.

In large cold storage rooms a more advanced method of obtaining circulation of dry air is shown in Fig. 1. In this system all of the insulated walls, ceiling and floor are provided with air channels which are interconnected and which contain a small cooling element which operates at a temperature lower than that prevailing in air spaces. Owing to the differences in the density of the cold and warm air a circulation is established through the spaces and the cooling coil, when the cooling coil condenses the moisture which accumulates as ice coils. The partial vapor pressure in the air then goes down to a point lower than the pressure in the adjacent layer. The air which circulates through the channels absorbs the entering vapor and increases the partial pressure in the air. If the circulating air quantity is sufficient, the air takes up all entering vapor without the partial pressure reaching the level of saturation pressure. The pressure in the wall is in this way kept on a level where no condensation risk exists.

The arrangement shown in Fig. 1 is of course not suitable for exceptionally large cold storage rooms. For such

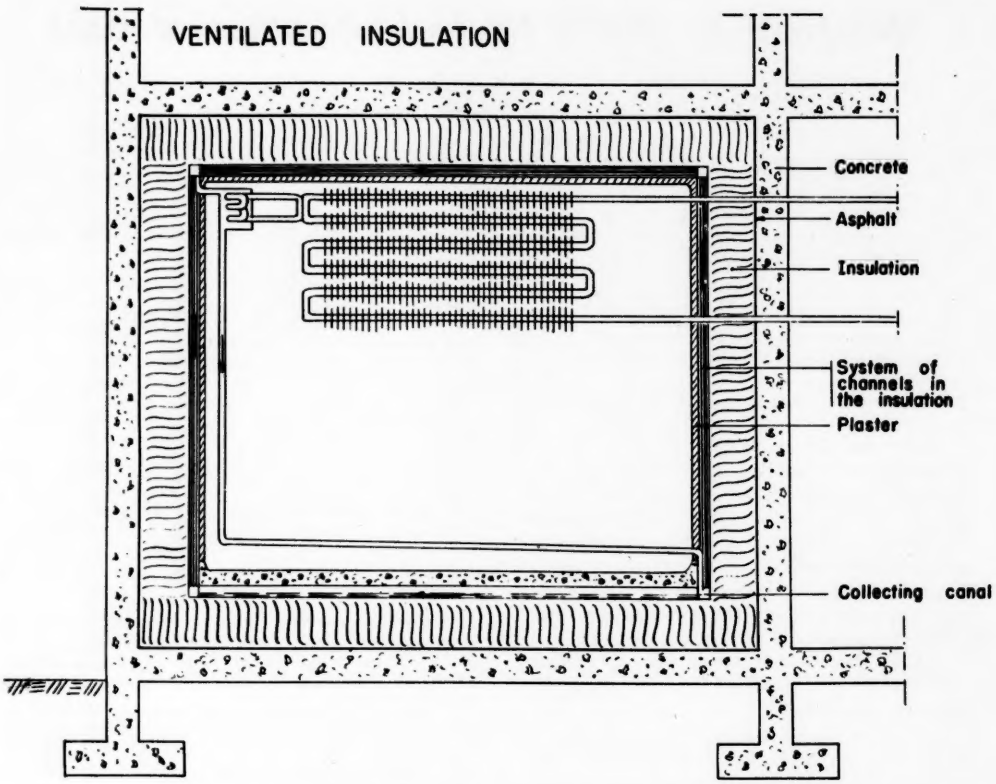


Fig. 1—Cross section of an insulated room shows the method and construction utilized to circulate dry air through the inner face of the insulation to pick up moisture and carry it away.

spaces it is more practical to use a central coil with fan and connecting air ducts.

Conclusions

In order to improve the moisture protection and maintain minimum K-factor in cold storage walls four possibilities exist.

a. Increase the permeability resistance of the asphalt barrier on the outside wall. Ordinarily, this increase of permeability resistance on the outside wall means an increase in the efficiency and durability of the asphalt coatings. A commonly known means of obtaining a more effective asphalt coating is the Swedish practice of using multi-layers of asphalt felt paper mopped on with asphalt coatings between the various layers of felt. This procedure clearly minimizes the danger of cracks in the vapor barrier due to settling of the building.

b. Still another way to improve the moisture protection is to decrease the resistance of the inner lining by using a very porous plaster. Unfortunately, a material which possesses this property and yet claims good durability and good hygiene is not available.

c. Insulating materials may be used which are non-permeable for water vapors, such as glass foam. To date most materials which are completely impermeable have K-factors which are noticeably higher than more commonly used cold storage insulations.

d. According to the author's experience, one of the most practical and effective ways of accomplishing the objective is to use a type of insulating material which permits the circulation of dry air in the insulating space adjacent to the inner lining. In recent years the author has made numerous installations in different countries which have proven the effectiveness of this method.

Southwest Air Conditioning Show

THE Southwest Air Conditioning Exposition will be held in connection with the 56th annual meeting of the American Society of Heating and Ventilating Engineers at Dallas, Tex., January 25-27, 1950. The exposition will occupy two modern buildings at the State Fair Park, the Hall of Agriculture and the Poultry Building, where facilities are provided for the display and demonstration of machinery and equipment used in purifying heating, cooling and moving air for industrial uses, as well as in promoting human comfort and health. The Society, composed of leading technologists, consultants and contractors in the heating, ventilating and air conditioning industries, is sponsor of the exposition, which is expected to attract a large number of exhibitors.

New Method of Freezing Eggs in the Shell

By Socrates A. Kaloyereas

Department of Agricultural Chemistry and Biochemistry,

Louisiana State University, Baton Rouge

PRESENT methods of preserving eggs by freezing require that the eggs be broken out of their shells, stirred to break the membranes, and stabilized by the addition of some material such as salt or sugar (9). The use of this product is limited to bakeries, confectioneries, and similar commercial establishments.

Up to the present time, eggs in the shell have been preserved only at temperatures above the freezing point of water. Ordinary cold storage, a combination of cold storage and gas storage (7), and other more or less empirical procedures (8) are commonly used. All these methods possess certain disadvantages including displacement of the yolk, weakening of the vitelline membrane, considerable loss of weight, acquisition of off-odors and flavors during storage, and various other minor changes.

Partial slight dehydration of the egg under vacuum.

A method has been developed in this laboratory for freezing eggs without cracking the shell. This minimizes the above undesirable changes, and the eggs are suitable for home use. Furthermore, the resistance of the embyro to freezing temperatures is increased, as shown by hatchability tests now in progress.

The beginning of the process goes back to 1937, when the author was working on the freezing of mushrooms at the Low Temperature Institute, Cambridge, England. There the idea came to him that if the amount of water corresponding to the expansion of the ice formed by freezing were removed uniformly from the tissues, it would probably prevent the disruption of the cells and obviate blanching. The preliminary tests at Cambridge indicated that this idea, despite the fact that the amount of water to be removed from the mushroom was found to be much more than the amount anticipated, was not without merit. The work was continued with more or less successful results on various other products in the laboratory of the Food Research Experiment Station, Athens, Greece, where the author was in charge until 1945. Meanwhile, in 1939, he obtained a Greek patent (4) on a process of freezing foods following partial dehydration which actually is the first original and theoretically established process of dehydrofreezing. The work was interrupted by the war, but resumed in Louisiana in 1946.

Since it appeared that expansion of the ice formed from the water of the tissues was the primary cause of most of the major changes occurring during freezing, a study was undertaken of the mechanism of these changes by associating them with the drip (the liquid exuded from the product during thawing). Adequate methods of measuring the drip have been developed (5, 6), and by their use it has been possible to accumulate a multitude of data, to be published later, corroborating the validity of the assumption that expansion is the primary factor involved in the changes which occur during freezing. One of the controlling factors in the process of expansion during freezing is the relationship of bound water to free water, which determines also the amount of drip. Dehydration affects this relationship as well as drip, though to a lesser extent in the freezing of eggs than in the case of other products.

Freezing treated eggs rapidly by immersion in alcohol-dry ice mixture.

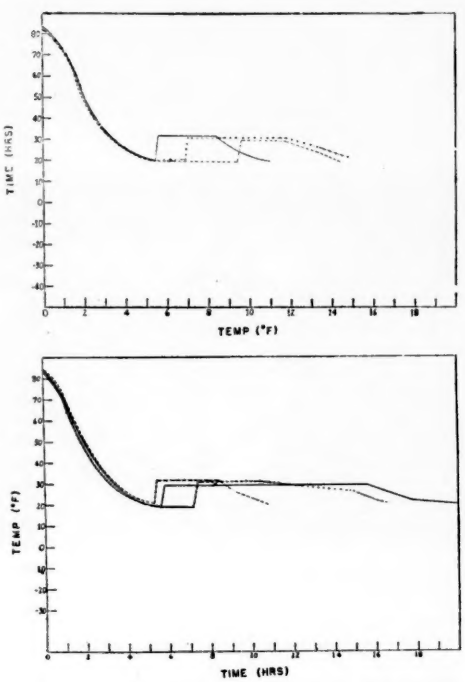
In the case of eggs the problem was to reduce the water content to the extent needed to provide space for the expansion of the ice formed by freezing. The necessary decrease in weight based on the water content of the egg and its water-ice curve (3) was estimated to be 6.1 per cent. The actual experiment showed, however, that elimination of a smaller amount (2-3 per cent) was sufficient for freezing eggs under vacuum without cracking. After finding that the treatment does not greatly change the bound water (the amount of which is rather small) of the egg whites and yolk (Table I), the effect of a vacuum upon the properties of the egg whites and yolk was examined, since vacuum has been used together with dehydrating agents for the prefreezing treatment. Determinations of the expansion of the egg whites and yolk before and after treatment under vacuum, as well as of their rate of freezing under vacuum, proved tedious until we were able to devise methods which gave reproducible results. The details of these methods will be published later.

Reprinted from Science, Feb. 18, 1949.

TABLE I—AVERAGE VALUES OF CONSTANT PROPERTIES OF EGG WHITES AND YOLK BEFORE AND AFTER TREATMENT (to a Loss of 8% Wt.)

	Before treatment			After treatment		
	Liquid	Solid	Yolk	Liquid	Solid	Yolk
Percentage of liquid and solid whites	41	59	.....	49	51	.....
Refractometer reading	14.63	14.61	48.38	17.17	16.76	48.53
pH	8.32	8.24	6.09	8.89	8.99	6.07
Redox potential millivolts at pH 7.0	+158	+156	+116	+139	+133	+95
Freezing point	−0.47	−0.52	−0.58	−0.78	−0.58	−0.60
Expansion by freezing at 20° F	7.20	7.50	2.5	4.85	5.20	2.40
Bound water	3.22	3.39	5.83	3.45	3.66	6.095

The results appearing in Table I and graphically in Figs. 1-3 show that freezing treated eggs under vaccum decreases considerably their expansion during freezing and reverses the rate of freezing in the various parts of the egg content when freezing takes place at about 20 F. In the fresh, untreated eggs the white freezes first and creates a solid wall around the yolk, so that when the latter freezes



Figs. 1-2. Rates of freezing of the yolk (.....), thick whites (————), and (.....) thin whites of untreated (top) and treated (bottom) eggs.

there is no room for expansion and the egg cracks. When the eggs are treated and frozen under vacuum, the yolk freezes first and pushes the white toward the shell so that all the room available in the air space is used during the expansion of the white. This, of course, allows better utilization of the space available within the egg. Removal of the gas from the yolk, on the one hand, and lowering of the freezing point of the white by the treatment, on the other, seem the probable explanation of this surprising result.

A contributing factor also is the small decrease in volume of the thick white during the freezing of the treated eggs through a partial breaking down of its mucin content, due probably to the change of pH under the reduced pressure of CO_2 (1), a fact which is associated with a change in volume. In one particular case, where the change of thick white to liquid was about 50 per cent, the change in volume was about 3 per cent. All these factors working together

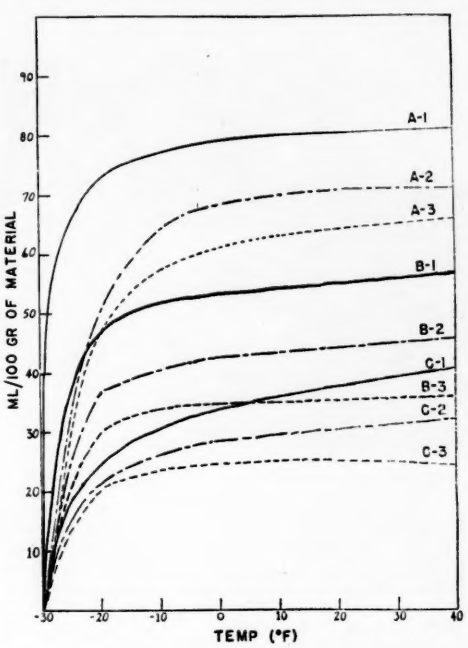


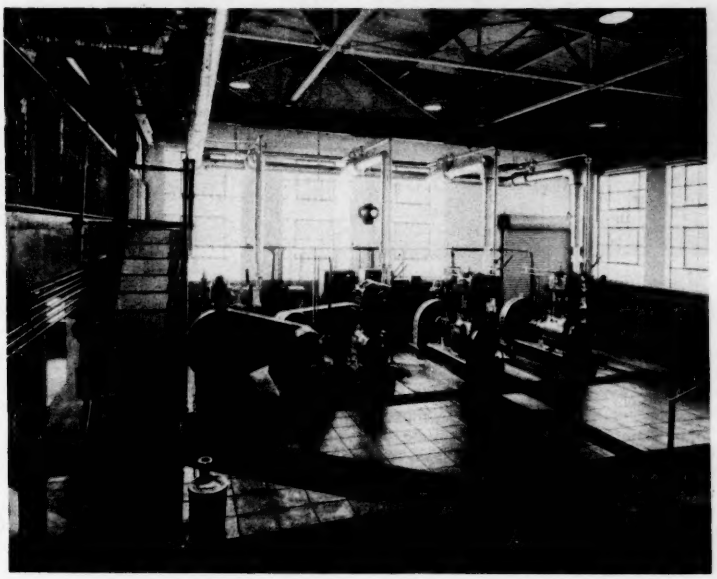
Fig. 3. Expansion of the white and yolk of the egg. A—white: 1, untreated; 2, treated; 3, treated and frozen under vacuum. B—whole eggs: 1, untreated; 2, treated; 3, treated and frozen under vacuum. C—yolks: 1, untreated; 2, treated; 3, treated and frozen under vacuum.

help to secure a better economy of space within the egg during freezing and reduce the necessary treatment to a minimum. Under these conditions the treatment does not affect the quality of the eggs at all; on the contrary, the whipping quality of the white is somewhat improved. The loss of weight during storage at 20 F and 85 per cent relative humidity was, in our experiments, 0.15 per cent per month, in comparison with a 0.23 per cent loss obtained

(Continued on page 62)

Costs Drop When Texas Ice Plant Modernizes

By J. J. Roberts
Manager, Spears and Miller Ice Co., El Paso, Texas



Engine room of the Spears & Miller ice plant after conversion to electric power presents attractive appearance, with space for good operation and maintenance.

FACED with rapidly increasing costs on all sides, in 1946 Spears & Miller Ice Co. at El Paso, Texas, owned and operated by The Community Public Service Co., with General Offices in Electric Building, Fort Worth, Texas, began investigating the reduction of costs by converting to automatic operation.

The plant was powered by two 180 hp Diesels, one 100 hp Diesel, and one 145 hp natural gas engine. Two 10x10 ammonia compressors were direct connected to the two 180 hp Diesels, an 8x8 to the 100 hp Diesel, and a 9x9 was belted to the gas engine. Auxiliary electric power was generated by two generators direct connected to the 180 hp Diesels, and one generator belted to the 100 hp engine. The freezing tank was an Arctic Pownall of 864 cans divided into 12 freezing sections of 72 cans each, the ice being harvested in batches, 72 block from one freezing section at a time, with a three block ice hoist.

Labor of some considerable skill was required to operate the engines, as well as the freezing tank. A forty-eight hour work week went into effect in September, 1946, making it necessary to employ four operators who also pulled ice. It was also necessary to employ a helper for each of these operators, to score and stack the ice as it was pulled, as it was considered inadvisable for the operator to leave the tank-engine room for any extended period, and also because the individual freezing sections would be out of service for long periods while the ice was being harvested and scored. The plant has consistently produced 86.4 tons per day from the 864 can tank, and the loss of freezing time involved would have materially lowered production.

Electric Motors Installed

Diesel and gas engines do not readily lend themselves to automatic operation. While this proposition was considered, the cost of the needed controls coupled with the risk with no spare units outweighed the cost of converting to purchased power, and it was decided to remove the engines and replace them with electric motors. The picture shows the engine room after this was accomplished.

This solved the problem of automatic control installation as well as eliminating the necessity for operators skilled in engine operation. However, this left the operator time on his hands (the time required to harvest 72 blocks from this type tank varies from 30 to 40 minutes) and a helper who was needed only two or three hours for each shift.

It was decided that a conveyor from the tank room to the day storage room would eliminate this helper and result in further savings. This conveyor is of unique design, and includes an automatic hydraulically operated dump, and automatic feed to the scoring machine. The operator need only place the ice as it leaves the scoring machine.

Ice Puller in Operation

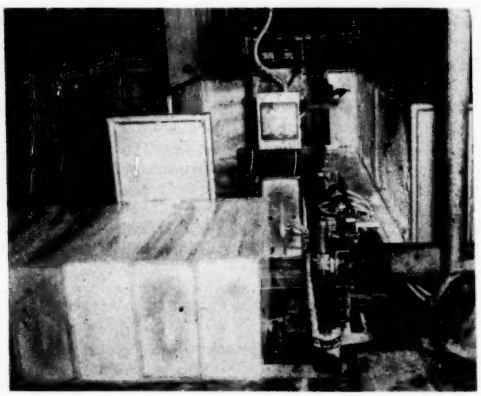
In operation the ice puller thaws out 72 blocks from the cans (in the Arctic Pownall tank the cans remain in position in the tank at all times) and the electric hoist lifts out three blocks at a time by means of 'dogs' frozen in the blocks. The three blocks are taken to the dump, the dogs

Hydraulic dump in operation. Dump straddles conveyor when in the down position, placing the blocks precisely in place for removal by the conveyor to the day storage.

thawed loose from the ice, and the operator pushes a button, then returns after three more blocks. The push button actuates the dump, which lowers the ice into position on the conveyor. The conveyor automatically starts, moving the ice off the dump. The conveyor then stops, and the dump rises to receive three more blocks of ice. This continues until 72 blocks are in position on the conveyor.

The ice puller then opens the valve to refill the 72 empty cans (which are still in position in the tank), places the section back on the freezing cycle, starts thawing out the next section, and goes into the daily storage to score the 72 blocks waiting on the conveyor.

In the storage, he closes a switch which starts the conveyor, bringing a block into position against an extension of the scoring machine feed chain. The ice coming into position opens a switch which stops the conveyor, and closes another which starts the scoring machine. As the dog on the feed chain moves the block of ice into the scoring machine, the reverse happens; the conveyor starts, bringing another block into position. In practice, the scoring machine does not stop as the conveyor, moving at six feet per minute, brings blocks into position before the scoring machine is ready to receive them. However, if for some reason the conveyor fails to do this, the scoring machine stops.



Conveyor bringing block into position to be automatically fed into scoring machine.

View of freezing tank and engine room after remodeling.

One man, then, on one eight hour shift, harvests and scores 64.8 tons of ice. In addition, he cores and refills 432 blocks, takes engine room report readings, treats water, and does the other necessary chores, making total production labor at this plant .125 man hours per ton of ice when production is at 64.8 tons.

Above this production point, it is necessary to place a second shift on, making it possible to produce 86.4 tons of ice daily from this 864 can plant with two men on two eight hour shifts.

Compressors operate automatically according to brine temperatures, and are able to hold brine temperatures to a four degree variation. Safety cut-outs are placed on low and high side of the ammonia system, tower water, and high liquid level of the accumulator. Controls are placed on cooling tower water pumps and fans to reduce auxiliary load when condensing pressures are low.

Results have been more than expected. Year round production labor has been reduced from .60 man hours per ton to less than .20 man hours.

Design and installation supervision was performed by the writer, assisted by W. H. Becker, Chief Engineer, and the plant staff.

Canadian Fisheries Department Plans Extension of Refrigeration

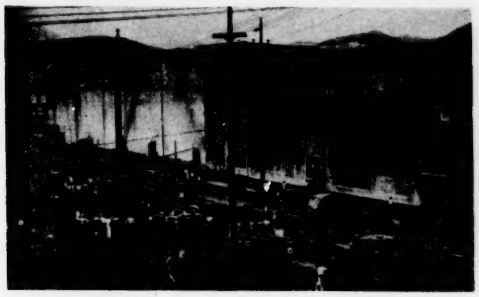
THE FEDERAL Fisheries Department of Canada, Ottawa, Canada, has plans for extensive use of refrigeration equipment in a program designed to put the east coast fishing industry on a permanent paying basis. The plan calls for construction of two reduction plants and a cold storage plant with bait freezing facilities. In addition, plans are being made with railroads to use better type refrigeration cars for fish transport. Terminal warehouses with freezing facilities will be established in leading cities. Freezing plants for curing fish also will be developed.

Commencement Ice Air Conditioned

THE COMMENCEMENT exercises of Alfred University, Alfred, N. Y., held early in June were specially air conditioned. Forty 100-lb. cakes of ice were placed at strategic points throughout the campus grounds where the graduation exercises were held. Then powerful fans were installed to complete the cooling process of the university's 244 graduates and spectators.

Fire Sweeps Utah Ice & Cold Storage Co. Plant Causes $1,306,000 Property Loss

A FIRE swept a three-story building of the Utah Ice & Cold Storage plant, located at 341 South Fifth Street West, Salt Lake City, Tuesday, June 28, causing property loss estimated at $1,306,000. The start of the fire was not known. Twenty firemen were overcome by smoke during the long struggle against the inferno and 20 hours after it was first discovered, firemen were still battling the blaze in the ruins.



Before flames burst out. Firemen arriving at the Utah Ice & Storage Company plant at the outset of the fire find the walls standing, with smoke pouring out of ventilators near the top of the three-story building.

The fire broke out in the candy storage room on the ground floor at 4:43 p.m. Tuesday just after a crew had unloaded thousands of pounds of candy. An officer of the company stated that the crew had cleared up the debris thoroughly before finishing their work and locking the candy storage rooms.

The million dollar-plus property loss made the fire the most costly in Salt Lake City's history. More than 150 firemen under the personal supervision of Fire Chief J. K. Piercey fought the roaring flames in the first general alarm fire in Salt Lake City since July 4, 1948.

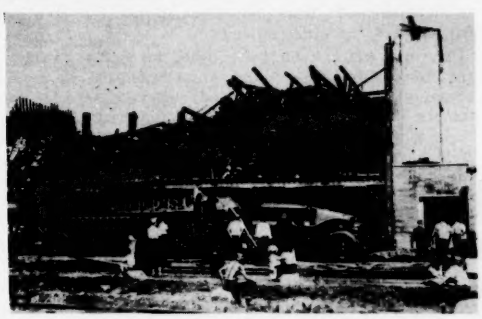
The fire reported at 4:43 Tuesday afternoon was brought under control within 12 hours, but more than 36 hours later pumper trucks were still spewing thousands of gallons of water into the blackened remains. At that time the concrete warehouse presented a sorry picture. Two walls had collapsed and the entire third floor was gone and parts of the second floor had crumbled away, leaving the center of the building a tangled mass of burned wood, bricks, charred chicken and candy and eggs. The west wall went down with a roar shortly after 7:00 a.m. Wednesday. The east wall swung slowly outward and splattered bricks and mortar on the adjoining ZCMI garage shortly after noon. Some 20 trucks had been moved out of the garage as firemen feared that when the east wall toppled it might damage the building. However no damage resulted.

Firemen Overcome by Smoke

Dense clouds of smoke mingled with ammonia fumes from the building's refrigeration system, proved the biggest obstacle to fire fighters. Twenty firemen were overcome by the dense smoke which eddied throughout and around the building and were taken to the Ninth East Emergency Hospital and the Police Emergency Hospital. At least ten more were revived by fleeting trips to portable inhalators set up at the fire scene.

The building attacked by the fire is a refrigerated storage building used by comparatively few individuals and firms for storage of large quantities of eggs, poultry and candy. It consists of a concrete basement two floors deep, and three floors above the ground. It was built originally as an ice storage warehouse. In 1945 one entire wall fell out and the building was then completely rebuilt and the five floor levels installed for storing frozen foods and other perishable commodities. An adjacent warehouse of the Utah Farmers and Poultry Cooperative was protected by firemen spraying six hose on it.

N. F. Hecker, plant superintendent, said the ice making and refrigerating machinery in an adjoining building at 551 West Third St., South was not damaged extensively and that it can still be used with minor repairs and persons with small lockers and storage units will have their service continued. Only about one-third of the company's Salt Lake City storage capacity was destroyed with the loss of the building, he said. Two other nearby refrigerated storage buildings owned by the company were protected by firemen and were not damaged.



After flames had done their work. All that remained of the fire-gutted warehouse Wednesday morning after blaze raged all night. The west wall of the structure, the roof, and the second and third stories had collapsed.

Mr. Hecker is credited by firemen with avoiding what might have been a horrible explosion. He ran to an adjoining refrigeration plant and closed the valves on ammonia pipes leading into the burning building. He then turned on pumps which took nearly all of the ammonia out of the pipes.

A. W. Hahn, company president was in Colorado Springs when the fire broke out. He left there immediately by plane after being informed of the fire. He said that 250,000 pounds of eggs, 500,000 pounds of frozen poultry and 500,000 pounds of candy were stored in the building.

Loss Covered by Insurance

As far as could be determined, all of the property loss was covered by insurance. Mrs. Arlene W. Hughes, vice-president and treasurer of the storage firm, said in Colorado City all of the company's $400,000 loss in buildng and machinery was insured.

(Continued on page 62)

Crushed Ice Packed in Waterproof Bags Keeps Vegetables Fresh

Photo courtesy Produce News

Showing method of packing vegetables into shipping carton with polyethelene or pliofilm bags filled with crushed ice and placed between bags of prepackaged vegetables.

AN INNOVATION in vegetable prepackaging was introduced recently by the Fort Pitt Tomato Co., Pittsburgh, Pa., for the purpose of maintaining freshness in their shipments of fresh vegetables. The idea takes the form of a packaging operation within a packaging operation, and it means briefly, that Fort Pitt is now bagging crushed ice as a distributive and merchandising adjunct to its cellophaned, trade-marked salad mix, cole slaw, celery, spinach and other products.

The bag which holds the crushed ice is 8 in. x 12 in., this size having been found suitable for use in regular shipping cartons, without added outlay for special containers. Two kinds of bags are being packed. One of them is polyethelene .002. The other is pliofilm FF140. Both have proved satisfactory as ice containers, although the polyethelene bag has the edge for durability where refreezing is desirable. A heat sealing machine closes the ice bags in the same assembly-line manner as the cellophane bags of salad mix, celery, etc., are sealed in the vegetable packaging operation.

Before receipt of this sealer, Fort Pitt resorted to electric irons to get out experimental shipments. The test bags were shipped to the plant disassembled, though cut to proper size. Twin sheets of the films were placed together and pressed into bags by this novel method. When filled with the ice, the bags were ironed to an air-tight seal. While meeting requirements in every respect, the test operation was naturally too expensive for continuation, due to the extra time and labor involved. The ice bags now come to the plant ready made.

Packer Absorbs Costs

The operation as now carried out increases production cost of the cellophane consumer units approximately 5 per cent. Fort Pitt absorbs this added expense in its entirety. It is felt, however, that this larger cost will eventually be eliminated and previous production cost lowered, through increased volume developed.

In packing the cellophaned vegetables into the shipping carton, the latter is tilted on the table surface by means of a narrow board that is angled sufficiently to hold the bags in desired position. The picture herewith shows the packing operation, the ice bag being in the center.

Items such as salad mix and cole slaw are packed in sixes. Three bags are first set upright against the side of the carton nearest the packer. The ice bag is then inserted against them and the other three bags placed on the far side of it. The carton is closed in the usual manner. In the case of celery, spinach and similar items that are packed in dozen units, the first half dozen bags are laid across the bottom of the carton. Next the ice bag is laid atop them, and the completing six units are placed across the top of the ice bag.

Get Precooling

Before distribution, the packed cartons are precooled an average of 12 to 15 hours. The crushed ice will hold in the bag, under normal weather conditions, approximately 20 to 24 hours.

In following their products through distributive channels, Fort Pitt found that most retail stores did not have refrigerated produce display. This was taken into consideration during the experimental stage of the icing procedure. The idea in mind was to provide retailers with a bag that could be refrozen indefinitely in their frosted food cabinets, for use on the produce display. Since a bag is included in every carton, retailers soon accumulate enough bags to ice not only their Fort Pitt offerings but their whole produce display.

This effortless new display icing method costs the retailer neither time nor money, but saves him hundreds of spoilage dollars. The iced produce is kept fresher a longer time on the display stand. Sales pick up due to the fresher appearance and faster turnover of the produce on the racks.

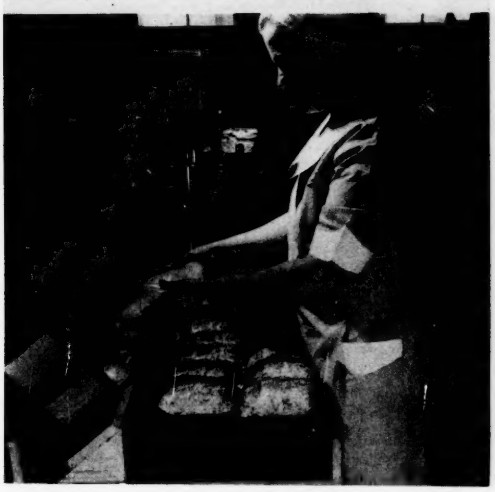
Smaller stores that do not have a frosted foods cabinet find use for the emptied ice bag for storing small quantities of cheese, meats, vegetables, etc., in their refrigerators. Some stores, too, give the bags as gifts or premiums with the purchase of Fort Pitt products.

Pre-pack Trade Interested

Reaction to the new icing procedure has been sensational on the part of the pre-pack industry as well as the trade. Long-distance inquiries have been received from New York, Illinois and Texas, and numerous calls from closer points have also been received. Trial shipments have been made many hundreds of miles to reach destination in excellent condition.

This icing operation is working out quite satisfactorily and because of it the company was able to continue packing right along during the heat wave in early July that scorched Pittsburgh as well as other sections of the country.

The new method may not solve all the problems that arise in warm-weather distribution of prepackaged fresh vegetables. It has, however, opened up a new avenue of improvement in the already rapidly growing pre-pack field. Coupled with intelligent retail handling and display, the operation points the way to greatly enlarged, year-round consumption of ready to use, garden-fresh vegetables in cellophane bags. It looks, too, toward maximum value from the advertising and promotion dollars spent by prepackers such as the Fort Pitt Tomato Co. to popularize their private brand labels.

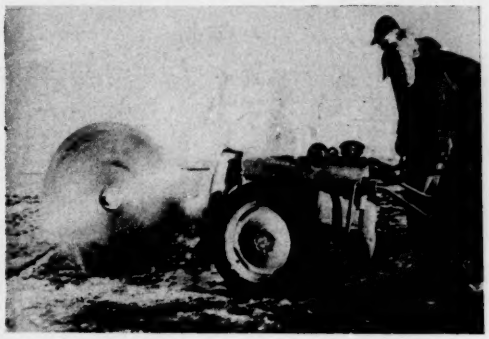


—Photos Courtesy Fort Pitt Tomato Co.

The three pictures above show the vegetable prepackaging operation in the Fort Pitt Tomato Company plant. Top, the icebags are being filled with crushed ice. Middle, the bags are sealed with a heat sealing machine. Bottom, the bagged vegetables are placed in carton with bag of ice in center.

Navy Seabees Show Eskimos Modern Ice-Cutting Methods

NAVY men in the Arctic are showing the Eskimos how to harvest their water "crop" with modern machinery methods. Ice, the main source of water supply in many sections of the Arctic, has been harvested by the Eskimo with a rudimentary handsaw and leather thong each fall since time immemorial.



Ice Harvesting Machine designed by Navy Seabees.

Navy Seabees at Point Barrow, Alaska, decided they could improve upon the slow manual method used by the Eskimos of cutting ice into blocks with a handsaw and then physically dragging the blocks out of the water with a leather thong. They adapted a motor-driven, circular-blade timber saw mounted on wheels to the ancient task of ice cutting, brought up a weasel (snow tractor) to pull the sawed cakes from the water, and then slid the finished products ashore on bent-pipe skids.

The result was 40 tons of ice cut and stored in a eight-hour day, the equivalent of 280 commercial-size, 300-pound cakes of ice, or more than an energetic Eskimo could cut and store in 80 days. Speed is essential in cutting Arctic ice because the entire supply must be harvested in early fall before the ice becomes too thick to handle.

Ice is an important source of water supply in the Arctic because it is easier to store and requires less processing to provide drinkable water since it loses its salt and organic impurities through crystallization. Water from glacial streams must be carefully filtered to remove indigestible silt; other pools and streams are polluted in summer by algae growth, and snow is too bulky (2.8 parts of snow are needed to obtain one part of water).

In adapting the timber saw to ice cutting, the Seabees used a thicker circular blade to prevent separate cakes from freezing together before being removed from the water, fashioned and adjustable shield to protect the operator from flying ice and water, and added equipment that permits the blade to cut to a predetermined depth up to 16 inches.

Electrical Energy Costs

A SURVEY has been made showing a tabulation of electrical energy use and costs by refrigerated warehouses for the year 1948. The tabulation shows total kw-hr consumption, total cost, and average cost per kw-hr for 43 cities in the United States and Alaska. The report shows total consumption per city ranging from 17,110,000 to 232,-400 kw-hrs, the total cost was from $186,420.00 to $4,365.40 and the average cost from .0157 to .0051 cents per kw-hr.

Car Icing Is Big Business at New Plant of Pacific Fruit Express at Roseville, Calif.

The first step in the car icing process at Pacific Fruit Express plant at Roseville, Calif. Here final touches are being given to a string of refrigerator cars that have been iced. Each car takes five and a half tons of ice.

ONE of the big refrigerator car icing plants is operated at Roseville, Calif., by the Pacific Fruit Express Co. Cars of perishable fruits roll into the extensive yards of this plant and are iced up for the long trip to eastern markets. This plant stores more than 51,000 tons of ice and makes more than 1,000 tons daily. It has capacity for servicing 300 refrigerator cars at one time. On the opposite page are a series of views showing the icing operation.

(1) The first step is making the ice. Here cans filled with water are lowered into the brine tank.

(2) After freezing the cans are lifted by crane and the ice cakes dumped on a chute leading to storage room.

(3) Arriving in the storage room the ice cakes are compactly piled to await shipping needs.

(4) Here ice is traveling by conveyor from storage room to the loading platform.

(5) The conveyor delivers ice to the loading platform, level with the top of the refrigerator car to be served.

(6) Up and down the long loading platform men work fast in pairs to get the refrigerator cars packed with ice.

Engineer Evaluates Heating and Cooling Methods

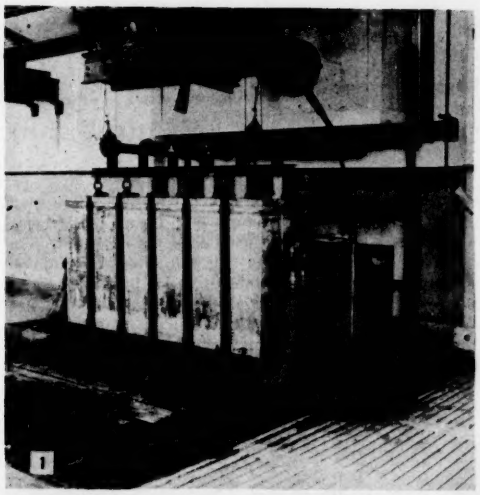
CURRENTLY popular systems of radiant panel heating were called "grossly over-rated" by Walter Fleisher, outstanding consulting engineer and former president of the American Society of Heating and Ventilating Engineers. Mr. Fleisher made his remarks in a talk given before a seminar of adult students of heating and air conditioning problems in New York University's Division of General Education.

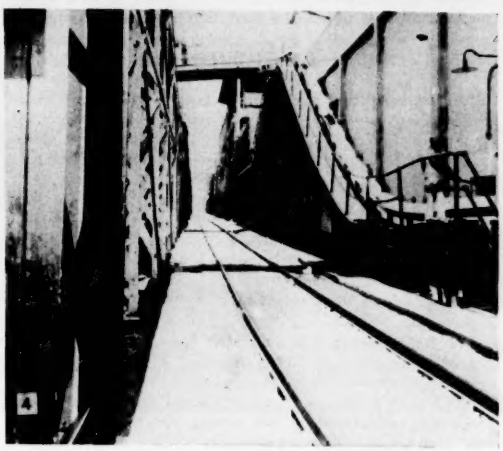
"Panel heating has been grossly over-rated," Mr. Fleisher said. "A well-insulated enclosure with any kind of radiation that will bring the surfaces of the room to proper temperature should act very similarly to any panel heating."

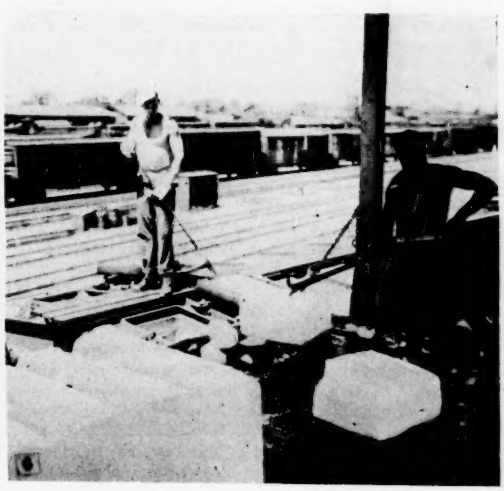
Despite his opinion of its limitation, Mr. Fleisher remarked that panel heating has shown the possibility of "a very marked reduction in the requirements of cooling by the instrumentality of panel cooling where very warm water, or water possible to obtain in the summer time, circulated above the ceilings would remove a great deal of the heat given off by the electrical fixtures, often one of the main sources of sensible heat gain in such places as department stores or rooms of this character. With the heat from luminous fixtures radiating toward the ceiling, coils in the ceiling could readily carry off a large proportion of this heat which otherwise has to be compensated for by low temperature refrigeration."

Mr. Fleisher emphasized that air-conditioning engineers should spend more time on winter heating problems rather than on summer cooling. "I don't feel," he said, "that there are many places in this country where refrigeration is required in a house. Certainly the suburban districts with their grass and trees and the very few oppressive days that we have, do not warrant refrigeration throughout the house. This I know is heresy, particularly for someone who has attempted to sell air conditioning all his life. My feeling is that humidification in the winter time is many times as important as cooling in a residence in the summer and as cooling in the summer means eventually completely closed windows or absence of windows, and as with none of our advances in air conditioning have we ever approached a June day, I would say let us go easy on the summer cooling problem and concentrate on winter heating."

Mr. Fleisher concluded, "We have spent much more time on gadgets than we have on the basic reason for man's adjustment to his environment, and we have spent more time because it is good business to sell luxuries rather than wisdom. Putting aside industrial uses for air conditioning which are primarily oriented towards the supply of sufficient regulated moisture to maintain a normal state, air conditioning is in a way an individual and subjective process and only when we are able to furnish air conditioning in the quantities required by the individual to suit the idosyncrasies of human reactions will we have perfect air conditioning. That to my mind is the air conditioning of the future. Possibly we shall never get this until we have a calmer outlook on the world in which we live."







Refrigeration without running expense

By Siegfried Ruppright
Consulting Engineer,
Los Angeles, Calif.

THE cost of refrigeration is governed by the temperature differential against which the refrigeration process is performed; it takes much more power to operate a freezer against rather warm cooling water than for running an air-conditioning installation with cool well water taking the heat from the condenser. Sometimes even, where the well water is cool enough to be applied directly, no refrigeration machine is needed.

Generally, these facts are interpreted as meaning that, while comfort cooling may be accomplished with cold-enough well water or by water-evaporative cooling in a desert cooler or an air washer, in all other cases the heat must be dealt with in the conventional way via insulation, circulating air, evaporator, refrigerant, compressor, condenser into cooling water from well, river, lake, or tower. While this is true for some of the heat, it is not necessarily true of all the heat that is encountered.

Some Heat Intercepted

California oranges are often precooled with tower water before they enter the processing plant, thus part of their heat is intercepted and disposed of without the use of refrigerating machinery. With a low wet-bulb temperature prevailing, this can amount to quite a large percentage of the total amount of heat to be removed. Such procedure recommends itself quite obviously with a commodity like peel-protected fruit. Its theory is an extension of the idea of cooling in stages in order to avoid dropping all the Btu.s to the lowest temperature level from which they have to be lifted with the greatest expense of equipment, power, and cooling water.

The heat leaking into insulated space is generally accepted resignedly and without being analyzed as to its origin for purposes of dealing with it in different ways. There are some, but rare, exceptions, for example evaporator piping embedded in the ceiling for intercepting the roof load at a higher temperature so it can be handled with higher back pressure (1), but the ice has been broken noticeably so far only in the air-conditioning field of refrigeration.

Solar Heat Load Eliminated

Intercepting the solar-heat part of the load by evaporating water on the roof of homes and department stores is nothing new any more.(2) Air conditioning operates with a temperature differential of say 150° F. dry-roof temperature minus 75° F. indoor temperature. In other words about 75 degrees is pushing heat through the roof. With a wet-roof temperature of about 80 F. the ceiling load is almost eliminated. With a freezer room at minus 10 F., the differential would be 160 and 90 degrees respectively. This may look like a much lesser saving, but it costs about twice as much to handle a Btu. through a freezer on account of the much lower evaporator temperature (back pressure), and the amount saved per square foot is about the same in both cases. It is therefore equally advisable to roof-cool a freezer as it is with air-conditioned spaces located under the roof.(3)

An illustrative case is that of the Terminal Refrigerating Company of Los Angeles. They occupy about 100 by 200 feet of a concrete building 150 feet high. The plant has a compressor capacity of 400 to 500 tons of refrigeration, the compressors being installed in the basement. This serves 1⅓ million cubic feet of cold storage, over half of it freezer storage, and a double-tunnel quick freezer of 2-carload-per-day capacity. Refrigeration also is piped out into the surrounding produce district. A considerable part of the roof area over the refrigerated space is shielded against solar load by pent houses and the large cooling tower, but some 6500 square feet are directly exposed to the sun.

Fig. 1. Howard Murray, efficiency-conscious chief engineer, shown starting roof coolers by opening valve.

Fig. 2. Wallace Newton, ingenious mechanic who devised installation on free plates supporting roof coolers.

This exposed part is served by a roof-cooling system (4) consisting of four rotary roof coolers, installed by the company's engineer at a convenient time between other activities. While the solar load amounts to a great number of Btu.s, it is not a matter of great importance in relation to the total load handled by the refrigeration machinery. But since the plant is efficiently operated this possibility of thermal savings was not overlooked. This plant is cited for its high standard of unusual efficiency of operation.

Making Waste Water Do Useful Work

As may be seen from Fig. 1, the roof-cooling system is supplied from a tap in the line that returns the cooling water from the condensers to the tower. The pressure at this point happens to be just right for operating the roof coolers to the desired roof coverage. In spite of the great height above ground level, no booster pump is required, and the great simplicity of the method chosen is fully realized. Fig. 2 serves to illustrate the ease of installation of this system. All four roof coolers are supplied by one simple U-shaped layout of ½-inch i.d. copper tubing laid on the roof. Regular plumber's drop-eared "L and T" fittings support the coolers. They are bolted to sheet-metal

(Continued on page 62)

Three-Purpose Refrigerating Plant Makes Ice

Refrigerates Freezing Plant and Maintains Temperatures in Refrigerated Warehouse

By Terry Mitchell

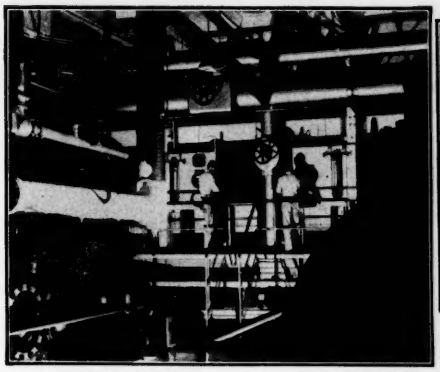
The quick-freezing system, at left, is connected by 600-ft. Conveyors to the Ice Making and Cold Storage Plants.

THE Terminal Ice & Cold Storage Co., of Portland, Oregon, is operating at Nampa, Idaho, a big plant which produces up to 500 tons of ice daily, furnishes refrigeration to a quick-freezing system some 600 feet away and maintains freezer temperatures in a large cold storage warehouse.

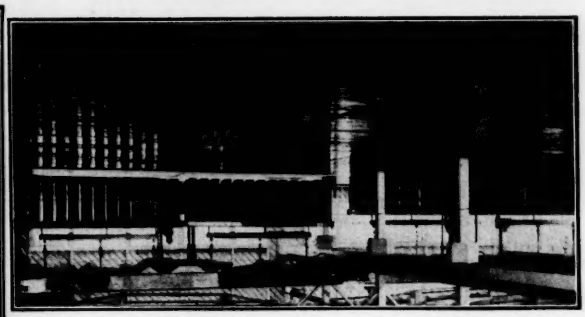
The ice is frozen in two tanks, each having 1196 cans of 300-lb. size. These cans are made 10 inches thick by 24 inches wide for rapid freezing, and are 51 inches deep. Under normal conditions, with brine at 7 F, and a suction pressure of 19 lb., the plant makes 460 tons of ice, all the cans being pulled every 18¾ hours. An absolute schedule for pulling the ice is maintained with an automatic electric warning bell. A full row of 26 cans, arranged in two grids, is lifted from each tank, and the various steps of the harvesting are interlocked so that 52 cans, or 7.8 tons of ice, are pulled every 23 to 25 minutes.

The dumps are air-actuated, and all harveting operations, including the filling of the cans, are controlled from the platforms suspended from the cranes. Conveyors discharge the ice to the day storage, where it is up-ended for holding, or delivered direct to the railway cars where it is loaded for shipping. The storage measures 100 by 132 ft. and will hold 1100 tons of ice stood on end. Twice this amount can be held by stacking. The tank room is 68 ft. wide and 132 ft. long.

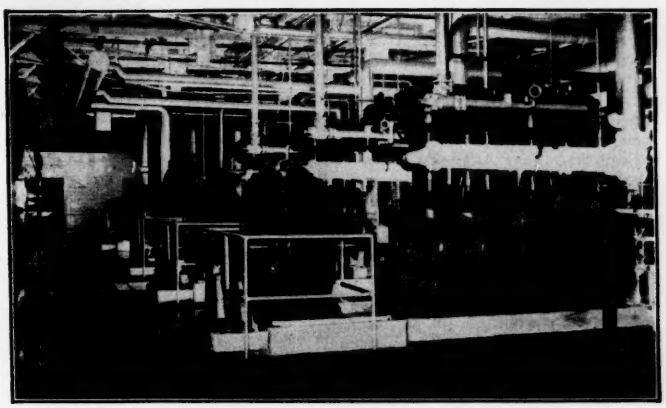
A belt conveyor carries the ice to the docks of the Pacific Fruit Express Company, a distance of approximately 1600 feet. Another belt conveyor brings frozen commodities from the food processing and quick-freezing plant, some 600 feet away. Railway cars and trucks serve the freezer, all commodities being handled on pallets. Each of the four storage rooms has a ceiling 24 ft. high, and is equipped with enough extra coils to freeze 10 to 15 tons of food per day, when necessary.



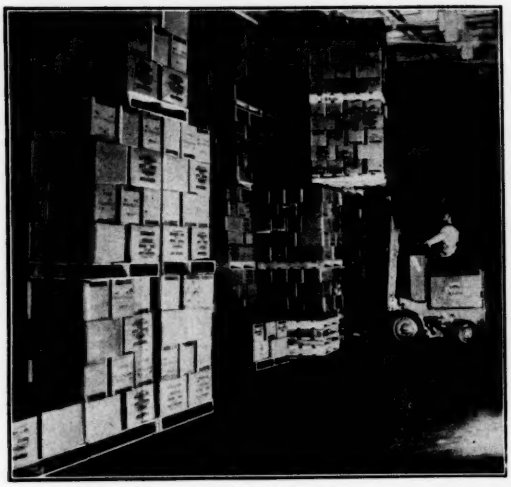
Temperature Throughout the Plant can be Read at the Engine Room Gauge Board.



Fifty-two Cans are Harvested in 23 to 25 minutes. All Cans are Dumped every 18¾ hours.



Ideal Synchronous Motors totaling 1600 hp. drive the seven large Frick Compressors.



Frozen Foods are Handled on Pallets in the Four Storage Rooms, which have Ceilings 24 feet high.

The level of the liquid in both the receiver and the tank coils is kept absolutely constant by a Bailey meter system. Thermo-couples permit reading all temperatures at the board in the engine room.

Refrigerating Equipment

The refrigerating equipment has sufficient capacity for freezing all the ice as well as handling a second quick-freezing plant as large as the one now being serviced, plus a freezer storage twice the size of the present one. The low-temperature cooling system has a capacity of 275 tons of refrigeration, and the second stage 850 tons. The booster compressors include a 15 by 10 4-cylinder machine and another with two cylinders of the same size. Three 12 by 12 4-cylinder compressors, a 2-cylinder 10 by 10, and a 2-cylinder 9 by 9 comprise the second stage. Space is provided for two future 4-cylinder 12 by 12's and a 4-cylinder 15 by 10 booster.

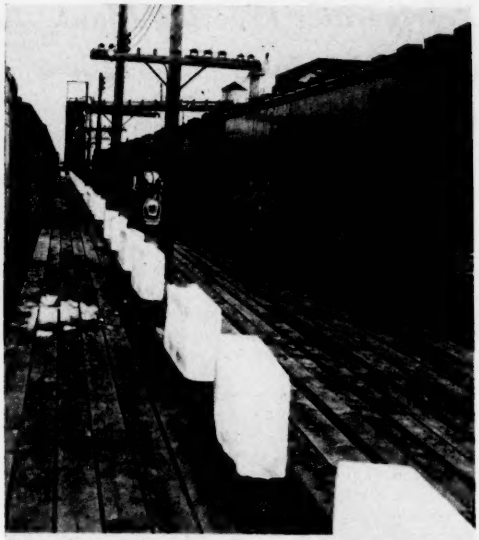
The compressors were all furnished by Frick Company of Waynesboro, Pa., as were the condensers and other high-side equipment. The synchronous motors, totaling 1600 horsepower, were built by the Ideal Electric Company, Mansfield, Ohio. The entire plant was designed and the mechanical equipment installed by the Associated Refrigerating Engineers of Los Angeles, Calif.

The four ammonia condensers are of the vertical shell-and-tube type, and are supplied with well water at a constant temperature of 59 F. The surface is ample enough to keep the summer head pressure between 120 and 125 lb. Economy is further enhanced by precooling the water fed to the ice cans by piping it through the dip tanks.

Refrigerator Car Rates Extended

THE Interstate Commerce Commission on June 27 extended to October 31 its service order 817 permitting shippers to use large refrigerator cars without paying a higher scale of rates. The order had been scheduled to expire July 8. The railroads are now preparing conforming tariffs.

New Icing Station Provides Quick Service for Perishables



Photos Courtesy New York Central Railway Co.

The new icing station of the Indiana Harbor Belt Railroad at Blue Island, Ill., in addition to its top icing facilities is capable of bunker servicing 80 cars at one time. The ice plant adjoining the service plants has a capacity of 1,000 tons daily and a 15,000 ton storage.

The Island type platform is served by two tracks, one on each side. The bulk of produce movement through Blue Island is from west to east, most of it coming from the Pacific Coast states and from Texas and Arizona. Principal destinations are the markets at New York, Boston, Cleveland, Buffalo, Rochester and Albany.

Upper Photo: Chain conveyor brings ice blocks to slings.

Lower Photo: Ice slinger at new car icing station handles 400-lb. block of ice.

The Ice Industry

National Association of Ice Industries

Executive Offices
1706 L St. N. W., Washington 6, D. C.

PRESIDENT
M. J. Garvey, St. Joseph, Mo.

EXECUTIVE SECRETARY
Mount Taylor, Washington, D. C.

1948 Ice Sales Nearly 47 Million Tons

TOTAL ice sales in the United States during 1948 amounted to 46,990,212 tons according to a survey completed by the National Association of Ice Industries. This was 11.28 per cent less than sales in 1947.

In the seven year period from 1940 to 1947 ice sales in the United States grew from 30,279,546 tons to 52,964,621 tons—an increase of 22,685,075 tons or 75.2 per cent. The decline of 5,974,409 tons in 1948 was a considerable drop but sales were still 16,710,666 tons greater than they were in 1940.

Detailed figures of 1948 sales are shown in the accompanying tables. In addition the survey also shows that:

1. The operating load factor of the industry was 58.8 per cent as compared with 55.9 per cent in 1947,—an increase of 2.9 per cent. Evidently, a few of the less efficient or unneeded plants were inactivated.

2. Total ice storage space in use in 1948 was 4,088,000 tons as compared with 4,552,600 tons in 1947.

3. Natural ice sales were 1,256,497 tons,—2.67 per cent of total sales in the industry.

Processed Ice Sales

In contrast with the 11.28 per cent decline in total ice sales, there was an increase of 2.6 per cent in sales of processed ice in 1948. Because so many ice companies still do not keep separate records of their processed ice sales, and also because there are no Census Bureau "bench marks" from which to work, it is impossible to determine accurately the exact amounts of cubed, sized, and crushed ice sold. But it is possible to show the trend, and the figures given in Table II show with dependable accuracy the direction and degree of changes of these three forms of processed ice. The "bench marks" originally established in 1945 may have been somewhat misplaced, too high or too low, but they were points from which to measure future changes, and they have remained fixed. So, the total tonnages of each type of processed ice shown in the survey reports in succeeding years reflect a true picture of what is taking place in the sale of those forms of ice.

TABLE I.—TOTAL ICE SALES IN UNITED STATES FROM 1944 THROUGH 1948

Division	1944 Tons	% Change Over 1943	1945 Tons	% Change Over 1944	1946 Tons	% Change Over 1945	1947 Tons	% Change Over 1946	1948 Tons	% Change Over 1947
New England	2,630,411	+11.8	2,795,477	+ 6.3	2,802,556	+ .4	2,774,236	—1.01	2,303,430	—16.61
Eastern States	9,788,495	+11.7	10,149,069	+ 3.7	10,436,261	+2.98	10,105,640	—3.17	8,805,881	—12.75
Southeastern	6,432,541	+16.8	6,837,041	+ 6.3	6,964,295	+2.01	6,652,239	—4.48	6,189,128	— 6.94
Southern	3,779,888	+18.7	4,130,793	+ 9.3	4,207,661	+2.01	4,143,612	—1.52	3,956,031	— 4.53
Southwestern	5,776,252	+18.9	6,167,915	+ 6.8	6,530,299	+6.03	6,387,024	—2.19	5,934,605	— 7.08
Great Lakes	9,912,592	+18.1	10,158,807	+ 2.5	10,688,175	+4.98	10,184,773	—4.70	8,728,344	—14.28
Western	4,090,813	+15.6	4,176,095	+ 2.1	4,466,893	+7.12	4,353,010	—2.55	3,757,786	—13.63
Mountain States	1,481,299	+14.3	1,614,316	+ 9.0	1,720,119	+6.71	1,749,371	+1.70	1,573,569	—10.04
Pacific Coast	5,113,600	+13.9	5,741,673	+12.3	5,817,558	+1.47	5,808,698	—0.15	5,080,038	—12.53
Northwestern	746,773	+20.5	812,489	+ 8.8	802,702	—1.06	806,018	+0.41	661,400	—16.71
TOTAL U. S.	49,752,664	+15.70	52,583,675	+ 5.69	54,436,519	+3.52	52,964,621	—2.81	46,990,212	—11.28

TABLE II.—PERCENTAGE OF COMPANIES PROVIDING PROCESSED ICE SERVICE

Division	PERCENTAGE OF REPORTING COMPANIES PROVIDING Ice Cube Service 1946	1947	1948	Sized Ice Service 1946	1947	1948	Crushed Ice Service 1946	1947	1948	Processed Ice Service But No Record In 1948
New England	44.7%	55.3%	55.7%	25.0%	36.8%	27.9%	47.5%	36.8%	41.8%	9.3%
Eastern States	38.8%	42.7%	38.2%	38.8%	37.3%	30.9%	45.6%	50.8%	40.0%	18.4%
Southeastern	7.7%	12.9%	16.6%	14.6%	19.8%	19.7%	36.9%	42.7%	44.8%	11.8%
Southern	10.7%	12.2%	7.5%	17.9%	29.2%	21.7%	32.1%	39.0%	29.0%	15.1%
Southwestern	9.4%	11.8%	4.7%	20.3%	27.9%	15.3%	67.2%	57.2%	56.4%	7.1%
Great Lakes	41.7%	43.4%	41.3%	30.1%	39.6%	32.7%	44.8%	45.9%	40.7%	13.3%
Western	28.3%	26.6%	25.9%	23.6%	23.3%	25.9%	48.1%	60.5%	50.0%	8.9%
Mountain States	29.2%	27.5%	38.1%	37.5%	27.5%	33.4%	54.2%	55.0%	38.1%	4.7%
Pacific Coast	41.9%	58.6%	63.2%	29.0%	20.6%	26.2%	48.4%	44.7%	31.6%	8.0%
Northwestern	0.0%	15.7%	15.3%	23.5%	21.0%	15.3%	70.6%	52.6%	45.0%	5.0%
TOTAL U. S.	27.4%	29.5%	28.1%	25.7%	29.5%	25.3%	46.2%	42.4%	48.5%	11.5%

TABLE III.—TOTAL ESTIMATED SALES OF PROCESSED ICE IN TONS

Division	Ice Cubes			Sized Ice			Crushed Ice		
	1946	1947	1948	1946	1947	1948	1946	1947	1948
New England	51,873	56,853	58,831	30,919	43,503	45,327	51,189	49,142	52,194
Eastern States	223,938	247,451	271,596	299,728	348,584	418,450	176,338	187,447	188,449
Southeastern	58,609	63,473	64,605	163,917	271,447	267,239	139,877	176,245	164,854
Southern	17,016	17,371	10,422	48,850	71,809	72,819	51,464	54,758	54,546
Southwestern	24,906	31,705	15,993	102,638	143,077	163,337	340,586	453,320	487,303
Great Lakes	165,839	182,579	189,886	341,398	442,793	443,279	187,200	247,104	224,025
Western	85,138	93,992	88,721	111,222	161,383	168,189	99,229	136,539	152,998
Mountain States	13,604	14,243	16,007	36,424	45,384	49,551	15,980	16,411	16,890
Pacific Coast	115,254	140,955	132,084	142,894	164,042	165,428	53,586	82,040	56,218
Northwestern	302	560	578	8,154	13,128	14,010	36,730	30,383	36,915
TOTAL U. S.	756,479	849,182	848,723	1,286,144	1,705,150	1,807,629	1,152,179	1,433,389	1,434,392
% Change Over Preceding Year	+33.7%	+33.3%	−.05%	+76.7%	+35.1%	+6.02%	− 7.3%	+15.3%	+ .07%

1947 Census of Manufacturers Reports Ice Production

The 1947 census of manufacturers has been made and a preliminary report of it was released by the Bureau of Census under date of June 8. The report shows that 3,432 establishments produced 46,300,000 tons of ice in 1947.

Commenting on the above figures a Bulletin issued by the National Association of Ice Industries says that the 1947 ice sales figures thus reported correspond almost exactly with those which the Association reported for the same year, last July. The 1947 U. S. Census figures cover the operations of 3,432 establishments engaged primarily in the manufacture of ice. They do not include the ice operations of any establishments, such as cold storage warehouses, breweries, etc., in which the production of ice was not the principal or dominant part of the business. Nor do they include the figures of any small, family-operated ice plant or natural ice operations.

The Bureau of the Census' reason for not including the ice operations of these combination establishments was to keep its over-all "Census of Manufactures" balanced,—to avoid including the business figures of any establishment more than once, but the fact remains that that policy eliminated the ice production figures of some 1,600 establishments engaged in greater or less degree in the manufacture of ice.

While it is true that the capacities of many of these 1,600 establishments, whose production figures were not included in the Bureau of Census' report, are relatively small, the total production of all of them is substantial. So, to arrive at a true total of all ice produced for sale in the United States in 1947, it is necessary to add to the total reported by the Bureau of the Census, the production of the 1,600 plants not included, plus all natural ice harvested that year.

It is estimated that the 1,600 plants and natural ice operations, not covered in the Census Bureau's report, produced approximately 15 per cent or 6,900,000 tons more, making a total of 53,200,000 tons produced by all commercial ice establishments in the United States. The survey reported last July showed a total of 52,964,621 tons. The difference of 235,379 tons represents an accumulated "drift" of less than ½ of 1 per cent in the Association's surveys during the eight year period from 1939 to 1947.

Other significant facts revealed in the Census Bureau's report are:

1. An increase of 134 per cent in the amount of salaries and wages paid by ice companies from 1939 to 1947.

2. An increase of 110 per cent in the product value of ice produced from 1939 to 1947.

3. An increase of 117 per cent in the "value added by manufacture" (value of product less cost of materials, supplies, fuel, and purchased electric power) from 1939 to 1947.

An expenditure of $20,000,000 for new plant and equipment by the industry in 1947.

Douglas New Superintendent National Ice Marketing Institute

THE appointment of Dr. Thomas W. Douglas as Superintendent of the National Ice Marketing Institute, effective August 1, 1949, has been announced by Mount Taylor, executive secretary of the National Association of Ice Industries.

Dr. Thomas W. Douglas

Dr. Douglas holds the degree of Ph.D. in Economics from The Wharton School of Finance and Commerce, University of Pennsylvania. Following graduation, he was appointed an Instructor in The Wharton School and specialized in industrial subjects, including marketing and personnel management. During World War II, as an artillery officer he served in the Economics Division of the Office for Military Government (Germany) where he was assigned to work relating to the future control of German industrial operations.

He has resigned his post at the University of Virginia where for the past three years he has been a member of the Economics Faculty. He has also been serving as vice-chairman of the Industrial Research Committee of the Advisory Council on the Virginia Economy, appointed by Governor Wm. M. Tuck. During this period, he was a visiting lecturer on personnel selection at the National Ice Marketing Institute.

The National Ice Marketing Institute functions under the Personnel Training and Marketing Department of the National Association, of which Daniel A. Prager is Director. Plans now being prepared call for an expansion of the important educational services of the Institute. The next series of Institute classes will start Monday, October 3 and run through March 19.

Utility Eliminates Ice Business

THE RECENT annual meeting of stockholders of Gulf States Utlities Co., Beaumont, Tex., approved elimination from the company's charter of the sale and manufacture of ice as one of the purposes for which the company was formed. The company now has no ice business.

Study Mechanical Refrigerators as Market for Processed Ice

OWNERS of domestic mechanical refrigerators are being surveyed to determine their needs for processed ice. The national study is being conducted through the joint efforts of the Research Department of the National Association and approximately 50 member companies throughout the country.

The Research Committee and the Personnel Training and Marketing Committee of the Association have been very much interested in determining exactly what type of market for processed ice is available in the country's homes which make use of mechanical refrigerators. In the past, when an ice customer purchased a mechanical refrigerator she thought she was through buying ice. Many times the iceman conceded that all of her needs for ice could be served by the mechanical unit. However, spot studies in widely separated areas clearly indicate that users of mechanical refrigerators can be profitable ice customers.

During the past year the Research Department and the Personnel Training and Marketing Department cooperated in outlining a proposed study to evaluate this market. Departments of the Association and member companies are working together on the project. Some 50 ice companies located strategically over the country are making the field investigations. The cooperating companies are using uniform questionnaires in surveying their own markets. Each company then will have the facts which can be used in serving its customers. Through compiling the data collected by the various cooperating organizations selected to represent their respective geographic areas, the Research Department will be able to develop the pattern of the national market. The information then will be available to the Marketing and Public Relations Departments of the Industry for use in planning programs aimed at adapting processed ice service and sales to the needs of this particular market.

Many icemen are recognizing the potential business in this field. Some are developing programs aimed at serving these customers, but the methods of making ice available to these users are by no means uniform. Before the Ice Industry can develop and carry out successful sales programs aimed at this market, it needs more facts. Ice manufacturers cannot afford to ignore these people as potential, profitable customers. Nor can it be assumed that daily ice delivery service to their homes would meet the customers' needs. Buying habits are no longer the same as when people owned ice-using refrigerators, and supplementary ice needs are unlike primary requirements. Yet, many of these people want and need auxiliary ice for many purposes.

The study is designed to develop the nature of the market, the type of ice needed, the purpose for which it is to be used, the type of service required, buying habits of the customers, and many other related points which are vital to efficient service. The regional surveys are to be made during the next two months. The information will be summarized and a report prepared by the National Association following completion of the regional investigation.

American Ice Declares Dividend

THE American Ice Co., New York, declared a dividend of $1.50 on the 6 per cent non-cumulative redeemable preferred $100 par stock, payable July 25 to stock of record July 11. This is the first payment this year. In 1948 the company paid $1.50 each in July and September and $3.00 in December.

Grocer's Bulletin Tells Why Produce Needs Crushed Ice

A BULLETIN has been issued by Winston & Newell Co., wholesale food distributors of Minneapolis, Minn., showing the results of their research on the use of crushed ice for fresh vegetables. The bulletin was issued for distribution to members of two voluntary chains of retail stores comprising approximately 600 food distributors throughout the West and Northwest. George E. Pannkuk, administrator of the fresh fruit and vegetable department of Winston & Newell presented a paper on this subject at the St. Louis National Ice Convention and his paper was published in the May 1949 ICE AND REFRIGERATION.

The bulletin points out that crushed ice helps maintain the quality and condition of perishables and reduces shrinkage and that cold temperatures maintain vitamin content. It further emphasizes that flavor, which is all-important to the consumer, is best retained by cold temperatures provided by crushed ice. Relative operating costs of three types of display fixtures, mechanical refrigeration, iced bed insulated, and dry bed not insulated and other operating figures are given, all showing very favorably for the use of ice. In addition, values derived from ice displays provide eye and sales appeal because the sparkling ice serves as an elegant background on which to arrange appealing displays.

Look Again It's an Ice-Box

This is the super deluxe Leonard ice refrigerator of the 1880's, luxurious enough to double as a buffet and sideboard in the dining room. In actual use for more than half a century, the model was part of a display at the 25th anniversary show of the American Furniture Mart in Chicago July 5-16.

Ice Plant Employee Killed

AS A result of injuries suffered when he was dragged into an ice scoring machine at an ice plant at Lexington, Ky., Roy V. Chisholm died en route to a hospital. Steve Mehanas, manager of the Southern Ice Company, is quoted in a news item as saying that Chisholm was caught in the mechanism, the cutter severing his right leg above the ankle and cutting into his stomach.

Manufactured Ice Industry Shows Big Increase Over 1939

MANUFACTURERS in the manufactured ice industry shipped products valued at $273 million during 1947, according to preliminary figures released June 8 by the Bureau of the Census, Department of Commerce. This is an increase of 110 per cent over the $130 million value of products reported by this industry in 1939, when the last census of manufactures was taken. Value added by manufacture in the industry during 1947 amounted to $226 million, an increase of 117 per cent over the $104 million value added in 1939. Value added by manufacture is calculated by substracting cost of materials, supplies, containers, fuel, purchased electric energy, and contract work from the value of products. For some purposes, particularly for comparing one industry or group of industries with another, it is the most satisfactory census measure of the economic importance of an industry.

TABLE I—GENERAL STATISTICS FOR THE MANUFACTURED ICE INDUSTRY, UNITED STATES TOTALS: 1947 AND 1939

(Money figures and man-hours in millions)

Item	1947	1939
Number of establishments	3,432	3,975
All employees:		
Number (average for the year)	46,462	37,230
Salaries and wages (total)	$103.0	$44.0
Production and related workers:		
Number (average for the year)	29,048	15,912
Man-hours (total)	70.7	n.a.
Wages (total)	$63.0	$17.8
Value added by manufacture[1]	$226	$104
Cost of materials, fuel, electricity and contract work	$47	$26
Value of shipments[2]	$273	$130
Expenditures for new plant and equipment	$20	n.a.

n.a. Not available.
[1] For 1947, value of shipments less cost of materials, fuel, electricity, and contract work. For 1939, value of production less cost of materials, fuel electricity, and contract work.
[2] Value of production for 1939.

Average employment in the industry amounted to 46,462 in 1947 as compared with 37,230 in 1939. Salaries and wages paid to all employees increased 134 per cent, from $44 million in 1939 to $103 million in 1947. The industry's expenditures for new plant and equipment during 1947 totaled $20 million.

Shipments of manufactured ice by all manufacturers covered in the census, are estimated at 46.3 million tons valued at $264.3 million during 1947. This is an increase of 43 per cent in quantity and 116 per cent in value over the 32.3 million tons valued at $122.6 million produced for sale in 1939. (See table II). Cold storage warehouses were not covered in the census, and shipments of manufactured ice by such warehouses are not included above.

TABLE II—MANUFACTURED ICE: QUANTITY AND VALUE OF PRODUCTS, TOTALS FOR THE UNITED STATES: 1947 AND 193

(Quantities in millions of tons, values in millions of dollars)

	1947 Total shipments and interplant transfers		1939 Production	
	Quantity	Value	Quantity	Value
Manufactured ice	[1]	$264.3	32.3	$122.6
Can or block	40.0	220.6		
Cubed, crushed, or processed ice	1.8	17.6	n.a.	n.a.
Ice not specified by kind	....	26.2		

[1] Estimated at 46.3 million tons, on the assumption that "Ice not specified by kind" was sold at the same average price as that for which both quantity and value were specified.

These statistics are derived from a preliminary tabulation of manufacturers' reports in the 1947 Census of Manufactures. Final and more detailed figures will appear in the census publication, "Miscellaneous Foods," which will be published and offered for sale by the Superintendent of Documents in the near future. Similar preliminary and final releases will be issued for other manufacturing industries. Preliminary industry group totals for the United States and for each of the states are now being issued. Detailed statistics for states, metropolitan areas, counties, and cities will follow.

Ice Makers Offer New Competition

A BULLETIN has been issued by the Research and Engineering Department of the National Association of Ice Industries on the two ice-making machines which are expected to appear soon in commercial ice markets. One of these is the Ajax "Electric Iceman" manufactured by Servel of Evansville, Ind., and distributed by the Ajax Corp. of America in Chicago. The other unit is the "Ice-Flo," manufactured by the Ice-Flow Corp., Lonsdale, R. 1.

Based on the theory that "You must know your competition in order to meet it," the bulletin passed along to members of the ice industry what the Department has been able to find out about these machines. It is expected that they will soon be offered and sold throughout the ice-producing areas with special attention to the best commercial markets. This information supplements the service kit issued by the National Association of Ice Industries on meeting this competition, a description of which was published in the July issue of ICE AND REFRIGERATION.

National Ice Marketing Institute

THE second series of National Ice Marketing Institute classes will open in Washington, D. C. These classes for the sales and service training for ice company personnel are under the direction of the Personnel Training and Marketing Department of the National Ice Association.

This institute, starting last year, attracted ice company employees from 32 states and Canada and all of them expressed high satisfaction from the standpoint of new methods and ideas learned and cultivation of new enthusiasms for the ice business.

Seven schools will be held this season on the following dates: October 3-14; October 24-November 4; November 28-December 9; January 2-13; January 23-February 3; February 13-24; March 6-17. Reservations for enrollment are being accepted in the order received.

Annual Ice Convention

THE 32nd annual convention of the ice industry will be held in New York at the Hotel Commodore, November 15, 16, 17 and 18. Preparations are already underway to make this one of the outstanding conventions in the entire history of the National Association.

The hotel room situation should be much more satisfactory in New York this year than it was in St. Louis last fall, but present indications point to a record-breaking attendance, and those who do not make their reservations early may be disappointed.

Using Crushed Ice for Shrimp

AN interpretative statement on results of using crushed ice on trawlers for fresh shrimp has been issued by Dr. E. A. Fiegler of Louisiana State University. Dr. Fiegler was leader of a recent Refrigeration Research Foundation project on fresh and frozen gulf shrimp.

He says that when crushed ice is properly used on trawlers (4-inch layers of ice and 2-inch layers of shrimp) it maintains a temperature of 32 F. in the shrimp—as determined in a trip on the "Ethel H."

Icing as practiced in the Gulf area results in considerable crushing of shrimp in the lower layers. On the "Ethel H.," various bins were filled to a height of 6 to 9 feet. Also the washing down of bacteria by melting ice tends to give exceptionally high bacteria counts to the lower layers. Removable shelves to divide bins into two or three tiers would be a partial solution.

Use of dry refrigeration resulted in better shrimp, bacteriologically, but resulted also in a much larger percentage of shrimp having black spots. Therefore dry refrigeration appears of doubtful value on trawlers. It is apparent that mechanical refrigeration will not be generally used in the near future on trawlers, principally because of cost. There is no doubt that a superior product is obtained when shrimp are frozen immediately after they are caught. Whether mechanical refrigeration will be successful for storage of fresh, unfrozen shrimp remains to be seen.

Dr. Fieger adds that research is progressing on efforts to identify the organism that causes black spot. He and his staff have obtained 20 pure cultures from black spots—and if, when any of these is inoculated into sterile shrimp, black spot develops, they will have a clue to the cause.

Ice Companies Charged with Monopoly

TWO ice company officials at Laredo, Tex., have been indicted on charges of conspiring to monopolize icing services there. The antitrust indictment against O. L. Longoria and John E. Foster was announced recently by U. S. Attorney General Tom Clark. He said that the indictment was returned by a federal grand jury at Laredo.

Longoria is a partner and Foster is general manager of the City Ice Co., of Laredo. Clark said Longoria and Foster are accused of trying "to induce and coerce their only competitor to sell his business to them or to enter into an agreement with them to fix prices and allocate customers."

Officials said the case comes under interstate commerce because railroad and truck shipments of perishable fruits, vegetables and sea foods are iced at Laredo.

Red & White Grocery Chain Opens New Refrigerated Warehouse

A NEW refrigerated food storage warehouse has been opened in Erie, Pa., by the S. M. Flickinger Co., of Buffalo, N. Y., sponsors of the Red & White Food Store organization. The new plant was built to handle fresh and frosted fruits and vegetables, butter, cheese and dairy products. It will accommodate ten carloads of fresh produce, ten carloads of frosted foods, and can ripen two carloads of bananas simultaneously.

Six new refrigerated trucks with special frosted food compartments have been added to the Erie fleet. Food is shipped from growers in refrigerated cars, stored in the new warehouse and then transported to Red & White stores in the refrigerated trucks.

Chain Grocers Expect Wider Use of Iced Vegetable Counters

WIDER use of crushed ice counters to store and display fruits and vegetables in retail stores will be seen during the coming year, members of the National Association of Food Chains predicted at a clinic on merchandising of these foods held in the Statler Hotel, New York City.

Approximately 150 top executives from retail food chains throughout the nation attended the meeting. The association's membership includes nearly all of the leading retail chain groceries in the country, it was explained.

"Increasing public demands for fresher fruits and vegetables of better quality have forced progressive grocers to adopt these refrigeration facilities," one executive explained. "This is an entirely new development in the food industry. Before the war, refrigeration storage and display was seen only in warehouses and wholesale plants."

It was agreed at the meeting that retailers of fresh produce now have little to fear from frozen food competition. Even during the past several years when the frozen food market was expanding so rapidly the majority of consumers switched from canned goods to frozen foods but relatively few abandoned fresh products when they were available, it was held.

Members of the association said that competitive conditions now existant in food retailing have made it essential that customer demands be given first consideration. It was frequently emphasized that the time has definitely returned when "the customer is always right." Retailers who do not recognize this fact will not stay in business, it was said.

The grocery executives predicted that "self-service" in the sale of fruits and vegetables will "inevitably be adopted by a large majority of retailers throughout the nation." The trend is growing rapidly, it was said, particularly because trained salesmen of produce are scarce. It has proven unsatisfactory for general clerks to sell produce, it was held.

For the same reason, pre-packaging is increasing and expected to continue growing during the next few years. Produce prices at the present time were estimated to be about 5 per cent lower than at the corresponding period last year and it was predicted that they will continue to ease in the majority of cases. Most fruit and vegetable crops are abundant and of high quality, it was explained.

Permian Basin Companies Organize Ice Merchandising Forum

THE FIRST meeting of managers and owners of ice plants in the Permian Basin, Texas, was held in the Permian Ice Co. office at Odessa, Tex., May 26, for the purpose of organizing a merchandising forum for the ice business in that area.

Tom Meacham of the Permian Ice Co., Monahans, was elected chairman and a committee on participation to decide when, how and who is to participate in meetings was appointed, consisting of A. F. Stobaugh, Odessa; M. A. Cook, Big Springs; and E. R. Bryan, Odessa.

Other committees were appointed as follows: Program Committee: M. A. Roberts, Midland; J. A. Green, Odessa; H. D. Lawless, Pecos; Publicity Committee: Lee Weathers, Midland; J. E. Carroll, Monahans, and one from each group formed by companies or cities as soon as they are organized.

Another meeting will be held as soon as the Participation Committee can get together and work out a program.

Home Town Newspaper Pays Tribute to Local Ice Man

A TRIBUTE to a well known midwestern ice man, Steve Martin of Centerville, Iowa was published on the editorial page recently in The Daily Iowegian, Mr. Martin's home town newspaper. Under the heading, "Editorial Ramblings" the editorial follows:

If you want a lesson in American business, a study of Steve Martin's career is worth-while. Steve Martin is the owner and operator of the Centerville Pure Ice Company. Several years ago, with the advent of the mechanical refrigerator, a good many people were sympathizing with Steve and wondering just how he would make out in the face of this new competition.

To make a long story short, Steve is selling more ice today than ever before, and he is looking to the future with confidence.

He accomplished this by attacking instead of retreating. The threat of mechanical refrigeration ran several ice companies to the storm cellar, but Steve Martin just took a new lease on life and started expanding. He improved his service. He enlarged the territory which he served. He launched a vigorous selling campaign, selling, among other things, ice boxes by the carload. He encouraged the use of ice in restaurants, drug stores, clubs. He sold ice cream freezers. Steve Martin's Pure Ice Company didn't retreat a step. Instead he pressed the fight, and against the odds of new competition increased his business.

The reason we tell this little story is just this. Often times we think we face terrific odds, become pretty discouraged. It just looks like everything is stacked against us. Well, when we get to feeling that way about things, it is time to remember Steve Martin and his ice company and to review his accomplishments.

I know just about what Steve will say when he reads this. "What do you mean facing odds? The other boys are the ones who had the odds against them. They are the ones who are on the run, not me. Why, the ice business was never better. Let them worry about me." Those will be Steve Martin's reactions, if I know him at all.

For one things, he is on the job. Recently, we carried a story about a dog being locked up in an ice box for 72 hours. The ice box was sitting out in the front yard. And the story ended—"the ice box had been recently replaced with an electric refrigerator." The next day Steve nailed me. Where did you get your information, he asked. I told him. Well, get your facts straight, says Steve, since the story should have read—"the ice box had been recently replaced with a new ice box." And we checked up, and found that Steve was 100 per cent correct.

That's what I call being on the job.

Who said that there wasn't plenty of opportunity in this country? He just didn't know what he was talking about.

Government Sues Ice Company For Overtime Not Paid

IN A suit filed in Federal District Court at Little Rock, Ark., the Standard Ice Co. of Little Rock and Walter J. Ayers of Memphis, Tenn., described as principal owner of the firm, were named defendants by the United States government, seeking recovery of $3,526.

The complaint declares that the company had a contract to furnish ice to a government agency. While the company furnished the ice, the complaint said, it breached the contract by neglecting to pay overtime pay allegedly due to certain employees. Also, the complaint stated the company was found guilty of a breach of contract by a Department of Labor examiner more than a year ago, and since the findings were not contested, the company owes the money sought.

Precooling Farm-Packaged Vegetables

ALTHOUGH the prepackaging of vegetables on the farm would permit some use to be made of the trimmed off parts and would reduce shipping costs, these advantages are considerably offset by the difficulty of precooling and maintaining proper refrigeration of the vegetables from farm to market so they will maintain quality.

This is shown in a recent study by Harold A. Schomer, plant scientist of the U. S. Department of Agriculture, and R. K. Showalter and L. H. Halsey of the Florida Experiment Station. With funds from the Research and Marketing Act and the cooperation of a commercial grower at Ruskin, Fla., they have made extensive investigations of prepackaging vegetables on the farm.

Their findings on broccoli illustrate the problem. When precooled to 35 F. and held at that temperature, packaged broccoli remained fresh and green 7 days and was only slightly discolored on the cut surfaces after 13 days. In packages held at 45 F, however, soft rot and discoloration appeared the second day and most of those held at 70 F were unsalable after the second day.

Precooling the packaged broccoli to 35 F and holding it at that temperature is the problem. Temperatures of harvested broccoli in the field ranged from 69 to 79 F. In the hydro-cooler these were reduced to 41 and 49 F. But they rose another 10 degrees during the short time—7 minutes—required for draining and packaging. And it took at least 19 hours to reduce the temperature to 37 F when the packages were placed in cold storage. Cartons placed in less favorable positions for air circulation required several hours longer to reach the optimum low temperature. Unpackaged broccoli in open wire baskets required only an hour and a half in cold storage to reduce the temperature to 37 F.

Ice Company Trucks on Display

Spelling out the name of the product they deliver to customers of the Kansas City Ice Co., this fleet of 88 Chevrolet Trucks has a total mileage of 13,000,000 miles and is probably the oldest automotive fleet of its size in the country. Vehicles have been in operation nearly 19 years and are still in daily service throughout greater Kansas City.

American Ice Company Buys Shares

THE AMERICAN Ice Co. has accepted the entire amount of common stock tendered to it by stockholders under its recent purchase offer. The final total of tendered stock was 66,762 shares. Prices ranged from $7.62½ to $9 a share.

Reports From Unit Ice Associations

New England Ice Association

By Ray T. Wilber, Secretary

NEW ENGLAND has been in the throes of a protracted hot spell combined with a six-week lack of rain. Temperatures ranged from 85 to 100 F. for several days. This has been good for the ice industry. To date, our manufacturers have been able to meet the increased demand. Due to the mild winter, only a small amount of natural ice was harvested. Natural ice is quite a factor in our northern New England States. The manufacturers have been cooperating with the natural ice harvesters in supplying their requirements to date.

Some progress has been made in the iced-vegetable program. The use of ice by market gardeners is slowly increasing, but there is considerable room for improvement. One important event has happened. One of our chain stores, which incidentally, is one of the nation's largest, last week installed their first iced-vegetable case in Massachusetts. Another was put in operation on Monday, July 11. These two cases have been built by the company; they will be used as test cases. Another division of the company has some thirty cases in operation in another New England State. Should they prove satisfactory to the officials of this company, New England will have made a tremendous step forward in the use of iced-vegetables.

Another outstanding success in New England has been the use by many of the large New England milk companies of the so-called "Milk Case Icer," a mesh bag filled with 15 to 18 pounds of crushed ice; this bag fits on the top of the milk case, one bag for each three cases. This gives satisfactory temperature and service. It eliminates the carrying of block ice and the chopping of ice at the point of loading. It is a labor saver for the milk industry and has many other advantageous features. The use of this milk case icer is rapidly spreading to other sections of the country and the subject is to be discussed at the National Milk Dealers Convention being held in California.

The sale of refrigerators has as far as I know been very limited; one or two companies are doing a fair amount of business in this field.

The automatic ice cube maker has made its appearance here as elsewhere and has been the cause of some loss of business; however, this has not been too severe as yet; many of the establishments that have installed these machines have found the supply produced by them is inadequate and they have had to continue to purchase cubes or sized ice.

At our Spring meeting, it was voted to affiliate our Merchandising Council with the program of the National Association. The Council is being expanded to have greater participation by the membership; due to the lateness of the season the reorganization will undoubtedly be delayed until Fall.

The Association has tentative plans to revive the annual outing which was abandoned during the war years.

From reports reaching our office, some of the New England plants are installing modern crushers and sizing machines to meet the increased demand for sized ice. The use of one trip disposable paper bags is increasing.

The New England Association, in cooperation with the National Association, is planning to continue the iced-vegetable research program at the University of Massachusetts. Prof. Snyder of the University has completed one phase of this work and has submitted his report. Excerpts of this report will be combined into some sort of a publication for the use of growers, grocers and others interested in the growing and marketing of fruits and vegetables. We hope to be able to place this publication in the hands of members of the Grange, Home Economist Association, Farm Bureau members, 4-H clubs, fruit and vegetable producers, State Departments of Agriculture, markets and grocers, etc. This distribution on the part of our association will be confined largely to the New England States.

Canadian Association of Ice Industries

By K. C. McCrea, Secretary

ICE sales in Canada are quite spotty at present but generally speaking they are considerably ahead of last year to date. Central and southern Ontario has experienced a prolonged hot spell with practically no rain since mid-June and ice stocks are dropping at an alarming rate. Some localities are already faced with rationing and others are endeavoring to avoid it by leaving their reserves untouched and buying as much outside ice as possible.

Up to about mid-June ice refrigerator sales to domestic consumers were quite slow and generally speaking lower than last year. Since then sales have improved considerably but it is very doubtful if they have regained ground lost during the early part of the year. Ice dealers whom we have contacted credit this drop in refrigerator sales to increased availability of mechanical refrigerators and increased retail prices on ice refrigerators.

The general employment situation throughout the country is not quite as good as it was but is still considerably better than average. Canadian ice servicemen are experiencing increasing difficulty in making collections from domestic customers which would indicate a tightening up in the family budget.

Illinois Association of Ice Industries

By Wm. D. Wright, Secretary

AFFAIRS of the Illinois Association of Ice Industries are in a rather inactive state at present. The men of the industry are very busy taking care of the expanded demand for ice occasioned by the heat wave which started the latter part of June and which is continuing at this writing. Up to the beginning of the heat wave, sales were down from 0 to 10 per cent below the preceding period last year. Some of the loss has been regained in the last two weeks and the next ten weeks will tell the story for 1949.

Reports reaching this office indicate that household and commercial refrigerators are moving slowly. There is some activity in chests and smaller pieces. The industry generally has not yet built up a trained and aggressive sales organization and fewer companies are devoting the time and attention to merchandising that they were before the war.

There is growing unemployment in practically exery locality in Illinois, which will have an adverse effect on sales, which is to be expected. This represents a return to normal conditions which, after all, is to be desired, and which will extend to all business operations.

Florida Short Course

FOLLOWING a very successful short course for ice manufacturers held last March, the Florida Ice Association has arranged to repeat the same course at Miami Beach, August 1, 2, and 3. The instructors will be members of the faculty of the University of Florida.

Kansas Ice Merchandising Council

A MEETING of the Merchandising Council of the Kansas Association of Ice Industries was held at Newton, Kans., Tuesday, June 21. Host for the meeting was T. E. Reiff, manager of the Newton Ice Co. C. T. Daniel of Topeka is chairman of the Council.

There was an attendance of about thirty representatives from all parts of the state. The group had as a special guest, C. H. Andres, sales manager of the Southwestern Ice and Dairy Products Co., of Oklahoma City, who acted as moderator of the evening.

A couple of ice equipment representatives were also guests and discussed latest devices for improving methods of preserving foods, both in the home and in retail establishments, restaurants, clubs and elsewhere. One modern item displayed was an aluminum five gallon water container so insulated as to keep water cool all day.

Other equipment shown included a movable cabinet for cold drinks, creams, salads and the like. Another was an ice cabinet for preservation of poultry and other meats which is finding a ready sale.

The council discussed problems of merchandising ice and ice appliances and the general improvement of service and public relations.

Ice Film Brings Results

ONE of the highlights at the Vancouver ice convention of the Canadian Association of Ice Industries was the showing of the National Association's color sound film, "Naturally Yours." Immediately following the showing, one of the Vancouver ice dealers requested use of the film to show at a regular luncheon meeting of his Lions Club. The request was granted promptly.

This alert ice executive then invited the heads of five Vancouver chain stores to be his guests at the luncheon. The results show what can be done to promote vegetable icing. The five chain store heads were definitely impressed with the iced vegetable method of retailing and asked for full information as to equipment and ice supply. Another food retailer present who was in the midst of building a new super market said he would have his plans changed immediately to permit installation of iced vegetable display equipment when available. Further, the ice executive who arranged this showing was asked to repeat it at two other Lions Club luncheon meetings.

Michigan Ice Association Elects New Officers

AT A MEETING of the Board of Directors of the Michigan Ice Industries Association held June 23, 1949, the resignation of Hiram W. Collins as president was accepted. Walter Hintz, general manager of Borin Bros. Inc., of Detroit, was elected president.

Mr. Hintz is well equipped to steer the affairs of the association. He has been in the ice business for 38 years, having started as a helper on an ice route run by the People's Ice Co. and worked from there to his present position as general manager of Borin Bros. Inc.

The directors also elected, unanimously, Joseph Oderman, Detroit City Ice & Fuel Co., as first vice-president and Ollie Webber, manager of City Ice & Fuel Co., Flint, Mich., as second vice-president. Vernon Powell, owner and manager of the Quality Ice Co., Cadillac, Mich., was named as a director.

Southern Ice Company Report

ACCORDING to the annual report of Southern Ice Company, Charleston, S. C., general business conditions throughout the territory served by the company eased considerably in 1948. Gross sales for 1948 were $3,181,717 compared with $3,105,656, an increase of $76,061.

The weather during the latter part of the summer of 1948 was relatively cool, therefore, not too favorable for ice sales. Gross ice sales for the year were $1,476,903 compared with $1,530,643 for the previous year, a decrease of $53,740. Gross coal sales for the year were $1,595,505 compared with $1,450,245, an increase of $145,260. Fuel oil sales were substantially the same as in the previous year.

Net income of the company after property retirement reserve appropriation was $118,985 compared with $178,-092 for the previous year, a decrease of $59,107.

There was declared during the year four dividends of 25 cents a share on common stock, and on April 1, 1948, $8,900 principal amount of 5 per cent sinking fund debentures were retired through the sinking fund.

The report states that work was started early in the fall of 1948 on the erection of a 25-ton ice plant at Pendleton, S. C.

School for Ice Supervisors

THROUGH the cooperation of the Department of Distributive Education of Indiana University, the Indiana Association of Ice Industries conducted two schools for supervisors during the week of May 30 and June 6. These schools were directed by Earl P. Tregilgus of Indiana University and were held in Indianapolis and Jeffersonville. The ice men attending these schools were much interested and expressed their desire to continue this type of study on other subjects. These programs are offered free of cost to any ice company and give them the advantages of professional instruction that would not ordinarily be available.

Dallas Ice Plant Damaged

DAMAGE reported to be about 50 thousand dollars occurred in the plant of the Superior Ice Co., Dallas, Tex., and adjoining buildings in an accident June 27. While newspaper reports attributed the damage to an "exploding ice machine," later information was to the effect that the belt broke on an engine governor which allowed the engine to overspeed. Portions of the engine flywheel hit the flywheel of a compressor and also ruptured some ammonia lines.

There was a considerable concentration of ammonia in the air and one person was slightly injured when struck by a portion of the flywheel. The plant is being repaired for continued operation.

Sales Contest Offers New York Trips

THE BIG 10 ice companies operating in Richmond, Ky., and other cities is having a refrigerator sales contest for employees this summer, running from March 21 to October 20. All employees are eligible except company managers and refrigerator salesmen. The two employees who receive credit for the greatest number of refrigerator unit sales during the contest period will be awarded a 7-day all-expense trip to New York City. In addition the usual commissions will be paid and merchandise prizes are offered.

The Practical Refrigerating Engineer
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OPERATING • MAINTENANCE • NEWS
QUESTIONS AND ANSWERS

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The Trends of Refrigeration in Great Britain

By W. R. Woolrich
Dean of Engineering The University of Texas

THE TWELVE month period devoted to liaison problems of science and technology in Great Britain and Europe for the Department of State by the author was naturally of deep interest to an engineer-scientist of the United States. For many years engineers in North America have emphasized that much more could be gained by the scientific groups at Washington if they would maintain such a liaison exchange with Great Britain and Western Europe than had ever been possible between North and South America. South America is very rich in the arts, archaeology and history, but in the pure and applied sciences has had little to contribute in advanced scientific thought.

Scientific and engineering research and development is receiving greatly increased emphasis in the British Isles and on the Continent. This is in itself a great challenge to the men and women of North America.

Historically, Great Britain has maintained a high productivity of fundamental and basic scientific research for decades, and the past two wars has accelerated rather than diminished this zeal for the fundamental sciences. But she recognizes that North Americans possess a peculiar ability to take these basic discoveries, both British and American and develop them into useful and valuable products. Britain's genius has been fundamental discovery. America's has been useful productivity.

Their current postwar zeal and ambition is being directed not only toward maintaining their initial position of fundamental science **supremacy** but more . . . overtaking the United States in its capacity to develop and produce useful products and equipment for the world markets.

In manufacturing competition, British manufacturers must necessarily have more venturesome investors than American. An American industry is usually financed on the basis of some assured domestic market that will absorb the major portion of its output. The export business of an American manufacturer is often carried by its assured domestic business and profit.

A large portion of the manufacturers or producers of Great Britain must develop their business primarily for export orders, and export business is not only highly competitive but the incidental costs of credit investigating, of packing and shipping and finally of collecting may be a considerable service expense. Furthermore, export trade too often is fickle, unpredictable and unreasonable.

Tax Handicap

For her domestic manufacturing, the greatest handicap placed on British manufacturers is the high tax they must endure. This is especially discouraging to young industries that are still paying off the costs of starting their business. It is not uncommon to find the smaller companies turning over virtually every pound sterling they obtain as between total sales and total expense to the Government for taxes. An observer naturally wonders how long such industry directors will be content to put forth all of their energies and effort just to furnish taxes to the Government coffers.

It can be assumed, however, that this problem of overtaxation will be solved. For those who engage in export business it has been solved already by making export manufacturing free of taxation in order to make it competitive on the world markets. They are determined to narrow the margin between their and our capacity to produce. The monthly prolonged sessions of a most active council of one hundred top members of Parliament with fifty selected active eminent scientists and engineers of Great Britain is just symbolic of their determination to push ahead.

The people of Britain have always been good sportsmen and most ready to meet a challenging competitor. But we must recognize also that they have a long standing record for tenacity and persistence. If we are to continue to lead in productivity, it will require a high degree of well planned research, scientific education, and venturesome manufacturing development to augment our present knowledge and facilities. The United States cannot afford to be lulled to peaceful contentment on the assumption that this industrial race is ever won to stay won.

Household Refrigeration

To the refrigeration engineer, the British Isles presents a much different panorama of activities than is current in the United States. The use of household refrigeration in

Presented to Rio Grande Valley Chapter, NAPRE.

all of this area lags behind that of several of her more northern neighboring nations and far in the rear of North America. The householder of England or Scotland can "get by" relying upon a pantry with a northern exposure to retard decomposition of some essential perishable foodstuffs such as butter, meat, fish and eggs. Furthermore, historically many of her people are accustomed to foodstuffs that are "cured" and may even avoid eating foods that they consider "too fresh for healthful consumption." The "fresher the better" attitude towards perishable foodstuffs is more acceptable in the Scandinavian nations than in the British Isles.

From the standpoint of manufacturing economics, it would be quite possible to produce an inexpensive table model of a food chilling unit for the cool climate of Great Britain. The problem is much less difficult than in the United States since a thirty degree Fahrenheit chilling temperature differential is ample for their entire Commonwealth while within the United States and many of the British colonies the designer must consider at least a sixty degree Fahrenheit differential between the ambient air and the storage space. Furthermore, most British people have suitable storage space in their pantries for all but the most perishable of foods, thus a small volume box is all that is necessary.

Locker storage plants have made but little progress in the British Isles partly on account of the cool climate, but more largely on account of austerity rations under which they must live. For even those people who raise their own mutton, beef and pork, it would be illegal to store any appreciable quantity. The amount of meat that is allowed per person varies from period to period but is commonly about thirty or forty cents worth per capitâ per week. Since meat is given a heavy subsidy support by the Government, this would buy the equivalent of forty to sixty cents worth in the United States. Such amounts are not, of course, conducive to expanding the locker storage business.

In nearly every residence center, ice is not obtainable and they wonder at the American's penchant for ice water. In the several thousand miles I traveled in the British Isles, I saw less than a dozen ice manufacturing plants and an ice delivery wagon was a rare sight. Even milk is delivered the year round without benefit of ice cooling. The principal use of ice in the coastal towns is for icing trawlers and fishing boats.

Heat pump installations are gaining some favor principally because the cost of coal is high and in competition with fuel burning efficiencies when using coal in open grates, the heat pump does not have serious competition. Furthermore, the comfort temperature accepted all over Great Britain of 63 to 65 F for living rooms is favorable to efficient heat pump operation.

Quick Freezing of Sea Foods

The most important work that has been done on quick freezing in Great Britain has been that related to fish and marine products. For breakfast, most Britishers have smoked "kipper"* several days each week and this is not entirely a war induced habit for it existed before the late war. The reports of 1938 show that their annual consumption was in excess of 300,000,000 lbs. of smoked herring. But for lunch and dinner the austerity program of food control has compelled the additional utilization of enormous quantities of fresh and smoked fish. With an almost negligible meat supply, fish of all kinds from sardines to whale meat are available in thousands of fish markets.

It is not unusual for the present day British housewife to serve fish three times in one day. With meat not available and cheese closely rationed, fish in some form is the most available protein food she can obtain.

The investigation on the antiseptic properties of wood smoke and its utilization in connection with freezing of fish has been most interesting. Millions of pounds of haddock are first "cold smoked," then quick frozen. It produces a very firm tasty white meat fish that is gaining popularity.

An extensive study at the Aberdeen Research Station has proven to the Government that no amount of icing will preserve most fish beyond twelve days. A refrigerated fishing boat that must spend twenty-eight days on an expedition is equipped therefore to process and quick freeze all of the catch except that taken within the period that will permit delivery within an eight or ten day period to the London market. Thus a boat coming in generally delivers a portion of its catch as fresh fish and a much larger portion as frozen.

The quick freezing of whale meat has become a very extensive industry for Great Britain and Scandinavian whaling expeditions. The whale today is furnishing most of the oleomargarine oils and thousands of tons of red whale meat quick frozen in the Antarctic for European consumption. Whale steak is like other mammal flesh and, if properly prepared, resembles a flank steak in both texture and taste.

Research on Freezing

At the Cambridge Food Research Station extensive research continues year by year on the preservation of foods by freezing. While there are not a large number of quick freezing plants in Great Britain for processing fruits and vegetables, the number is increasing and most of the basic research on quick freezing processes is controlled from the Cambridge Laboratories.

It is of interest that the quick freezing of fruits and vegetables in all of the Scandinavian countries is receiving wide attention and usage even in a greater degree than in Great Britain. And one of the most active countries in the quick freezing industry is Iceland. They recognize that to compete on world markets with perishable foods they must produce a high quality product. Furthermore, nature is kind to them in providing plenty of cold water and a cool climate for freezing and preserving their perishable goods.

There are several of these nations that are creative of new freezing processes usually of a very practical design. For example, the principal creamery of Oslo is equipped with a Hegerud freezer which consists of a rotating pressurized double walled cylinder with a magazine feed. The broccoli or other product is packed in a perforated treated card board container then fed into one of the several charging cages in the cylinder. After complete charging in the several cages, sterilizaton steam is admitted to the sealed cylinder and the product sterilized at 96 C or 205 F, for several minutes. The drum is then cooled to 88 F by water circulated in the annular refrigeration space of the doubled walled cylinder. This condenses the steam and the freezing space is thus placed under vacuum. The water and water vapor are carried off by a vacuum pump. The refrigerant now replaces the cooling water and in one hour the entire charge of 350 lbs. of vegetables is completely frozen to 0° F. It produces a very excellent packaged product.

Marine Refrigeration

No nation in the world has done a better job in marine refrigeration than Great Britain. Their two largest manufacturers of refrigerating machinery, the J. & E. Hall Com-

*Hot smoke cured herring.

pany of Dartford, Kent and L. Sterne Company of Glasgow, Scotland, build and equip a large portion of the Merchant Marine and British Navy refrigeration units. The J. & E. Hall Company have been manufacturers of engineering equipment for 170 years and started manufacturing of marine dry air refrigeration machinery in 1883. Subsequently they changed to carbon dioxide and they are still great advocates of carbon dioxide refrigeration for steamship lines and marine applications. Their arguments for this preference for carbon dioxide over the modern Freons are that it is inexpensive, that leaks are easily detected and the refrigerant can be obtained throughout the world at a very low price. One of their recent pamphlets sets forth that its cost is about 1/15 of that of Freon and much easier to maintain as a charge in the refrigeration system.

It is also interesting to find this same company now the sole owners of the patent rights on sleeve-valve ammonia compression machines. The sleeve-valve was promoted in the United States by the inventor, Mr. E. Prestage some twenty years ago but it never did receive much consideration from American manufacturers. The original British manufacturers, H. J. West and Company, were unable to make it a financial success although their machines were giving very excellent service in several points in Great Britain. In recent years, their assets have been taken over first by the Liverpool Refrigerating Company then in turn by the J. & E. Hall Company. A typical sleeve-valve ammonia compression machine costs about 15 per cent more than a comparative ammonia compression machine with poppet or plate valves, but in the larger units can be effectively and economically operated on two different suction pressures.

The L. Sterne and Company at Glasgow has a very large plant devoted to Freon equipment and a smaller but older plant devoted to heavy refrigeration machinery. Since many of the largest steamships built in the world are constructed either on the Clyde at Glasgow or on the Forth at Edinburgh, the Sterne organization is quite naturally called upon to do much building of refrigeration equipment for marine application.

The original Sterne plant was built by L. Sterne, an American who had fought with the Federal Forces in the War Between the States, then was sent to Glasgow to represent the De La Vergne Company of New York. After installing several De La Vergne machines in Great Britain, he decided to start his own manufacturing with the assistance of some British capital. It is interesting to discover that although Mr. Sterne was a very successful man in Great Britain he never gave up his American citizenship because of his great love for Abraham Lincoln. The Sterne organization today is considered one of the most progressive manufacturing plants of all Western Europe. My personal observation of their manufacturing methods leads me to believe that they can readily compete with our American manufacturers.

To meet all of the special research needs of the marine refrigeration industry a research center is maintained with offices at Cambridge under the title of the Marine Cargo Refrigeration Research Association.

Marine refrigeration is of such economic importance to Great Britain that the establishment of a special research group on this phase of food preservation and storage construction is most justifiable.

The manufacture of the Freon has just been placed on a commercial production basis by the Imperial Chemical Industries of Great Britain, a corporation with very close associations with the Dupont industries of the United States. However, the "ICI" as it is familiarly called, will produce the Freons under a special British name of "Arcton". They will also use different number symbols—for example Freon 12 and Arcton 6 have the same physical and chemical properties. It is unfortunate that the manufacturers cannot get together on a standard nomenclature for refrigerants of identical properties.

While there are a large number of other manufacturers of compressors and refrigeration equipment in Great Britain, only those who have an appreciable share in the marine refrigeration business seem to prosper. The most successful refrigeration machinery manufacturers are those who have catered to the marine field and given time and effort into solving the special needs of cargo refrigeration.

The British Thermostat Company at Sunbury-on-Thames, Middlesex, produce fully eighty-five per cent of the refrigeration control devices for British industries and manufacturers. A personal inspection of their research and manufacturing facilities gives a convincing reason why they do control this enviable position in the temperature control field. Their productivity methods as well as their technology is very superior.

Features of Purdue Convention Program

39th Annual Meeting, Nov. 8, 9, 10, 11

IN a little more than three months the members of the N.A.P.R.E. will be enjoying a most interesting and profitable convention at Purdue University. Professor H. G. Venemann has arranged a number of unusually fine features in the Educational Program of the convention.

These include four special Lecture-Demonstrations on subjects closely in line with the daily plant work. The information presented will also prove especially timely and valuable in the maintenance and construction season which follows the convention in most refrigeration plants.

The subjects in this group are: Electrical Equipment and Its Operation, Use and Care of Plant Instruments, Maintenance Tools and Their Operation, Modern Uses and Methods in Welding. Each of these subjects will be presented in two parts: first, a lecture which will present the fundamentals and provide an explanation of the different phases of the subject, then a demonstration of the actual equipment in use will follow. From this type of presentation the convention attendants will receive and retain for future use a maximum of the information presented.

Efficient Plant Operation

There is a well recognized tendency in all plant operations to keep closer check on the condition and performance of the equipment in order to get the most out of it while maintaining it in the best possible condition. These subjects on the program are specifically designed to assist engineers in fulfilling these objectives.

The use of instruments to check operation of the refrigeration system will be explained. The method of applying these instruments in order to obtain accurate readings will be shown along with the most suitable types available for the purpose. Of course instruments must be ac-

curate if they are to yield reliable data and methods of care and checking, as well as minor maintenance will be discussed.

Following the lecture the actual use of the equipment will be demonstrated. This will be shown in the mechanical engineering laboratory where operating and testing equipment is set up. Further details on proper methods of checking and instrument maintenance will be included.

The same type of lecture-demonstration will be given in relation to electrical equipment and instruments. In this case, however, the lecture and demonstration will be supplemented with information on methods of operation and maintenance in connection with motors and controls. Additional phases to be included are information on proper wiring, grounding and safety in connection with electrical equipment.

Purdue University has an unusually well developed and equipped machine shop. In fact an elaborate new section is just being completed at the present time. A lecture and demonstration will be presented by the staff of this department to acquaint the convention attendants with the latest shop practice which they can utilize to obtain the best maintenance and repair service in connection with their plants. First the significance of many of these new developments will be presented in a lecture. Then the group will proceed into the shops to see how this work is carried on.

Welding has continued to increase in importance in all refrigeration plants, not only in the original construction, but also to facilitate maintenance and repair operations. Modern uses and methods of welding will be the subject of the fourth lecture-demonstration on the program of the Purdue Convention. The information presented in the lecture will cover those points of primary interest to the general users of welding and the demonstration will give them familiarity with the methods which produce the best and most durable welds.

These are a few examples of the fine program which will feature the Purdue Convention. All of it is geared to the needs and desires of men who have charge of and operate refrigeration plants. Now is the time to make definite plans to attend this meeting. Detail information and reservation forms will be distributed to all members later this month.

N.A.P.R.E. Question Box

NOTE: H. G. Venemann, Chairman of the Educational Committee, has agreed to answer through this column all questions asked by members of the N.A.P.R.E. Please send your questions to him care of Purdue University, West Lafayette, Ind.

Defrosting Zero Freezers

Question No. 817: I have a problem in defrosting for zero degree low temperature rooms. I have hot gas line from an 8 x 8 ammonia compressor which runs through a cooler and then feeds to four different rooms. My trouble is, at times it works all right and then at times it slugs back to the machine very fast and has to be watched very closely. I do not like to defrost with the compressor and would like to know if it would be advisable to have a suction trap with an ammonia pump returning liquid to the receiver. I have not seen a system of this type and those I have asked express a difference of opinion. Could you advise what is the best method? At present we have to defrost with a hand scraper instead of using the compressor.—F.P.

ANSWER: It seems to me that if the operator at times can defrost the coils without any trouble, but at other times he gets liquid slugs back to the compressor, it is possible that when he does not get liquid slugs that he defrosts before too much ice has accumulated, or possibly he was careful in opening the suction valve very gradually when he starts to put the coils back on the suction line.

While it would be perfectly proper to put in a suction trap with an ammonia pump returning liquid to the receiver, a job as small as this hardly warrants this expense and the owner would probably not consider this outlay of money.

I would assume from the tone of the letter that the hot gas line to the individual rooms is connected at the same end of the coil as the expansion valve, so that when he defrosts, he closes the liquid line off and the suction valve, then defrosts by opening the hot gas line, and after defrosting puts the coil back on the expansion valve and suction line.

On a good many jobs we have found it to advantage to connect the hot gas line near the suction outlet and then when defrosting a coil, we close the suction line valve off and have a bypass around the expansion valve, so that the coil can then act as a condenser. In operating a plant in this manner, we close the liquid feed line off at the receiver so that any hot gas would condense both in the condenser and receiver, and the coil which you are defrosting. The liquid from this coil is fed back through the liquid line to the expansion valve of the other coils. On a system of this kind there is less probability of getting slugs back to the compressor.—Charles Knox.

Stuck Freezer Doors

Question No. 818: What are the best methods of reducing the accumulation of frost and ice around the door gaskets of freezer doors?—J.R.H.

ANSWER: It must be first recognized that the moisture which has formed the ice or frost on the door or door frame came from the warm side of the door. It did not come from inside of the freezer room or from the inside of the door. Since the presence of frost and ice indicates that the surface to which it adheres is below freezing, it might be well for the operator to determine whether there is adequate insulation in the door behind the frame.

Many icing conditions are the result of unusual amounts of moisture being present at the doorway. Inspection of the area adjacent to the door may reveal that water in either vapor or fluid form is coming directly in contact with the freezing surface of the door or frame. It has been found in many cases that leaking water lines, wash downs of floors and walls, splashings from adjacent processing or washing machinery have been the source of water in its fluid form. Methods must be devised to prevent this water from coming in contact with the door frame. In other cases, abnormal humidity conditions caused by processing machinery, washing operations, open floor drains out of which may come steam from pipes carrying hot water runoff, steam leaks from piping, etc., may be obvious sources of high humidity. Elimination of the source of moisture should correct the icing condition.

Perhaps the most difficult condition is met when operators' process methods require a freezer opening from a cooler maintained at 35 to 38 F. In most cases, atmospheric moisture in the air, admitted into the cooler space, will be deposited on the door as well as the frame. It is suggested that a coil with the temperature lower than the temperature of the face of the door be installed in the cooler or a blower be installed to activate the air movement across the cold door surfaces. This is a difficult condition to cure without lowering the temperature of the cooler room below that desired by the processing method. In many such installations, Jamison Double Seal Infitting doors have been used, resulting in an ice deposit on the

sides of the door and the jambs. In many cases the removal of the back gasket from the frame rabbet (stop) has improved conditions materially.—J. V. Jamison, 3rd.

Liquid Refrigerant Pump

Question No. 819: In our quick-freezing plant the liquid ammonia pump is noisy and appears to wear too rapidly. This is a gear-type pump operating on liquid around –40 F. Can you suggest any remedy to improve the pump operation?—S.R.E.

ANSWER: Liquid ammonia pumps are notoriously noisy and inclined to rapid wear. Even very slight pressure drops in the pump suction line cause considerable flash gas, which aggravates the noisy operation.

At the operating condition (–40 F.) mentioned by the questioner, this matter of flash gas is bound to be a real problem because of the high specific volumes encountered at the low pressures involved. For instance, if for convenience we assume a pressure drop from the 10.41 p.s.i. absolute at the –40 F. mentioned to the approximately 9.68 p.s.i. absolute at –42.5 F. each cubic foot of liquid actually pumped will take along with it nearly two cubic feet of gas. This entrained flash gas is the real problem. It can be minimized by enlarging suction lines and connections; but it can never be eliminated because there must be some drop in pressure between the accumulator and the pump mechanism.

To reduce wear to a minimum, it is well to locate the liquid connection high enough on the accumulator to insure effective trapping of oil and other foreign materials in the accumulator.—J. E. Watkins.

Methods of Applying Refrigeration To Freezer Storage Rooms*

By Regis Gubser

Chief Engineer, California Consumers Corp., Los Angeles, Calif.

TO ANSWER the question on freezer refrigeration methods properly, I believe we should outline the three principal methods of applying refrigeration.

The first method is to use all prime surface pipe coils; these may be refrigerated by either direct extension of full flooded refrigeration. This makes no difference. The pipes are usually applied to ceiling or walls with normal gravity air circulation.

The second general method is to use finned or extended surface coils with a defrost method. This defrost may be one of several kinds, such as water defrost, hot gas defrost, or warm air defrost. This makes little difference in the final result.

The third principal method is to use a non freezing solution, such as brine or glycol spray unit.

The first method is recommended in rooms in which there is no freezing of fresh products and particularly where the products stored in the room are either packaged or cased and also where there is very little infiltration of outside air. All these items tend to keep the amount of frost down to a very minimum. Thus the pipes will have long periods between defrosts.

The second method recommended where there is some freezing of fresh products in the room and where there is a little more than minimum amount of infiltration of outside air, but not an excessive amount, so that the coils may be defrosted at rather infrequent intervals such as two or three times per week.

The third method is used where there is considerable freezing in the room or where the air infiltration from the outside is excessive, causing severe accumulation of frost. With the no frost type of unit the moisture is taken care of as rapidly as it enters the room and the surface retains its original capacity throughout the entire period of operation.

With the first type mentioned it is desirable to add sufficient pipe surface so that there will be very little temperature difference between the refrigerated surface and the temperature of the room, thus promoting a high relative humidity which also decreases the amount of frost accumulation.

Use Governs Choice

As to defrosting by sublimation, we do not think this is possible, because the frost will just leave one set of coils and attach itself to the other. It will not be removed from the room, but will be collected, first on one and then on the other set. The method we use in defrosting such coils is to scrape that portion of the coils that is over a clear place in the room and as the occupied place in the room becomes vacated, to scrape the coils over it, with various tools and iron bars that will fit around the pipe.

In the second method the defrosting of the extended surface coil can be either accomplished by water defrost, hot gas defrost, or using of outside air. Each one of these has its own advantages and disadvantages, depending upon the particular installation, such as the availability of water and drain lines, the location of the unit so that it will be accessible to outside air readily, or the ability of the system to supply sufficient hot gas to do the job thoroughly and quickly without raising the room temperature.

Another advantage of the first method in which the gravity type coils are used is that a great deal of refrigerating effect comes from radiation which is available throughout the entire room and especially when 1¼ in. pipes are used instead of 2 in. This tends to give a greater distribution of refrigeration with less velocity of air which also retards dehydration. We have all three methods of refrigeration in use at our company and each one does a very good job in its proper application.

When Ducts Are Required

A further question was, when are ducts required for distribution of air from refrigeration units. We have found this to depend particularly on the shape and size of the room in which they are applied. If there are many small units well spaced so that the throw of the fan is not too great, no ducts are required. If large units are spaced far apart so that the fan will not throw the entire length of the room or width of the room, it is then necessary to put some form of ducts to bring about complete distribution of the air in the room.

In this type of unit there is very little radiation effect and it is therefore necessary that some minimum amount of air distribution be maintained throughout all parts of the room so that uniform temperatures will develop, both high and low and also in all of the corners of the room.

I hope this reply will not be more confusing, but may help to corollate some of the answers you have received from prominent engineers.

I am very pleased to have been asked to help you answer these questions as it is one that confronts a great many engineers, and it is sometimes difficult to receive the proper answer, because each one has a particular preference. In some cases the engineer has something to sell which also influences his answers.

*This discussion of the subject was furnished in reply to Questions Nos. 812 and 813 in accordance with our request. Other discussion on the subject is presented in the June and July issues. —H.G.V.

N.A.P.R.E. Department

New Questions

Mercury Manometers

Question No. 820: Is there any question of safety in the use of a mercury manometer pressure gage on the suction side of ammonia systems? I have heard that over a period of time the mercury may react with the ammonia to form an explosive mixture.—L.D.F.

Locker Room Temperature

Question No. 821: In our locker plant we have one room 36 x 12 x 12 ft. high insulated with 6 in. of corkboard. It is refrigerated by a 1¼ in. pipe coil 480 ft. long. The room contains lockers and the door is opened about 50 times a day. We have two twin cylinder ammonia compressors: a 3 x 3 and a 2¼ x 2¼. The plant has four rooms, each with a separate set of coils with thermostat and solenoid valve. My trouble is that when the rest of the locker plant is down to temperature and the machines are pulling on this room the back pressure goes down as low as 10 in. vacuum in order to bring the room down to 4 F. and that is the best it will do. What remedy do you recommend?—M.L.S.

Agitator Aerates Brine

Question No. 822: We have a vertical propellor type brine circulator or agitator in our brine cooling tank. On the discharge side of the brine stream there is a considerable release of air bubbles. Apparently the agitator is pulling air into the brine which I have been told will make it more corrosive. Is this true and how can I prevent this treatment of air in the brine?—C.P.N.

Member Activities

San Jose

By Fred Byl

ON JUNE 2 the San Jose Chapter held its annual steak barbecue in Wielands Gardens of the Pacific Brewing and Malt Co. The weather was just right for such an occasion. The steaks were very good and we could have all the Wieland brew we wished. About 125 members, their wives and friends were present. This event closed the group's very successful spring meetings, which we have enjoyed and from which we have benefitted in knowledge of refrigeration and its application.

Prof. Harold Hayes of the College of Engineering at University of Santa Clara has been very ably instructing the group in the fundamentals of refrigeration. Along with his discussions on the basic refrigeration cycle, the use of ammonia and other refrigerant tables as well as the Mollier Diagram in solving practical problems was brought out in a very convincing way. The subject of heat transfer was taken up in the form of solving practical problems as presented by chapter members. The psychrometric chart was brought into use in his discussions on cooling towers, determination of humidities with special emphasis on lower temperature conditions, and air conditioning problems. There is no doubt Prof. Hayes with his enthusiasm and down to earth way of presenting his subject has contributed greatly to bring out a good crowd at our regular meetings.

In addition to Prof. Haye's part in our programs, we have had guest speakers with subjects of timely interest to the members. Following is a summary of the subjects and speakers presented in the past half year:

Fan Characteristics by Mr. Buoy of Sturtevant division of Westinghouse. Members were presented with a useful air handling data book. Mr. Buoy discussed the characteristics of various types of fans and their application.

Refrigeration Maintenance Process by A. Gibbs of the York Corp., San Francisco. His talk dealt largely with contract maintenance and stressed thorough preventive maintenance, leaving nothing to chance. Mr. Gibbs topped his presentation off with a number of baffling magician tricks which made everyone sit up and take notice.

Algae Control in Cooling Towers by A.S.R.E. National Vice-president Edward Simons. His presentation was exceptionally interesting, bringing out points in cooling tower performance and maintenance in an impressive and unique way.

New Developments in Concentrating Orange Juice by Use of Refrigeration by Bob Kilburn of Food Machinery Corp. Mr. Kilburn described a vacuum evaporation process of orange juice that made you feel that the new products were far superior to the natural orange juice.

Application of Insulation by K. N. Cundall of Laykold Sales, American Bitumuls Co. Slides and samples were used to describe the "cold" application of board insulation. New products are being developed that should be watched by refrigeration engineers.

V-Belt Engineering and Application by G. S. Peterson and Robert Brock of Gates Rubber Co., proved to be a very interesting program. One point that was brought out was that there is constant research trying to develop better V-belt drives. Application data books were presented to the members that will be a valuable addition to their files.

Economics of Refrigeration by G. F. Dodson, president of Security Warehouse & Cold Storage Co. Mr. Dodson's talk was outstanding. He brought out the fact that in the cold storage business there is a very high capital investment ($20,000) per man employed which is considerably above average business under-taking and topped only by railroading and the like.

Application of Metalizing by Harold Pawsey brought out many points in metalizing that were new to many of us. Metal spraying of equipment subject to corrosion is a promising field of application.

Ice Vending Equipment by Leslie E. Scott. Mr. Scott is a member of San Jose Chapter. He is one of the pioneers in this phase of the ice industry and had a very interesting story to tell.

We are looking forward to starting our fall meeting with a plant visit to the newly constructed Owens-Corning Fiberglas plant here in the Santa Clara Valley.

Yakima

By Edmond Allard

During recent months the educational section of our meetings has been under the direction of George Tilbury. The various components of compressors have been discussed as well as their relation to the refrigeration plant as a whole. An attempt has been made, and generally we were able to follow through, of having a picture shown at every other meeting. This of a mechanical or operational nature.

At the suggestion of President Luther Stewart, the four regular meetings of the summer months are being supplemented by inspection trips to industrial plants in the district. In line with this policy, the plant of the Upland Winery at Sunnyside, Washington, was visited. Arrangements for this had been taken care of by Howard Peterson. Mr. Steenborg, manager of the plant, took the group and their guests through the plant, showing the various steps of the process. The evening closed in the guest room of the plant, where refreshments were served.

Memphis

By Charles Conley

A number of members of the chapter attended the Lubrication Clinic held at the Chisca Hotel by the Riechman-Crosby Co. The meeting was preceded by a buffet supper and lectures and demonstrations on oils and other lubricants followed.

Through the courtesy of Don Mayer, manager of the Memphis Lamp Works of General Electric Co., we enjoyed an interesting tour through their plant. This is a very modern plant which produces numerous types of electric light globes. Included in their line are Christmas tree lights, small indicating and flash light bulbs.

The group of 47 members were conducted through the plant by Mr. Mayer and his associates. The plant equipment was most interesting and we were much impressed by the safety ideas incorporated in it as well as the facilities provided for the comfort and convenience of the company personnel.

After an illness of about six months, Mrs. Mary R. Stanton, wife of Charles Stanton, chief engineer of Hotel Peabody died on July 6. Mrs. Stanton and her husband had celebrated their 57th wedding anniversary earlier this year. The members of the chapter joined in extending their sympathy to Mr. Stanton and the other members of the family.

N.A.P.R.E. Department

Minnesota

By R. F. Bonney

More than 35 members and guests gathered at the Franklin Cooperative Creamery Association of Minneapolis to inspect the plant and equipment. Guides conducted the guests through the plant and explained the operation of the modern milk pasteurizing and bottling equipment, as well as the extensive refrigeration plant required for the operations. In addition, the creamery operates an up-to-date ice cream making and packaging department.

After the inspection the group was entertained with songs by the Franklin Male Chorus and shown a movie, "Friends and Neighbors." The evening was climaxed by a lunch of ice cream and cake.

New Orleans

By Frank Gillio

During this period of the year when all air conditioning plants are operating at full capacity, Educational Chairman Vivien arranged to have representatives from the Minneapolis-Honeywell Regulator Co. at our meetings of June 8 and 22 to talk on Electric and Pneumatic Controls, knowing that the membership would appreciate these talks.

J. M. Stall, sales engineer, was the speaker at the June 8 meeting and Robert Lindsey continued at the next meeting. Both speakers explained in detail the operation of both types of controls and from the number of questions asked it was obvious that the attendants were keenly interested in this vital subject.

Due to the extremely hot weather our attendance has dropped some, but we are fortunate to have between 30 and 40 members present at all meetings.

A. L. Da Silva, Superintendent of Maintenance for the American Radiator and Standard Sanitary Corp., was accepted as a member and was given the oath of membership by Second Vice President Howat.

The final returns on the ads for the Operating Data Book are in and our members secured ads as follows:

Thomas C'Connor	23
L. J. Vivien	7
J. Chaisson	2
F. X. Gillio	2
J. R. Tennyson	1

President Ford paid tribute to the excellent work of these men, "We wish to extend our sincere thanks and appreciation to these members for securing these ads, especially to Tom O'Connor, who gave unselfishly of his time and efforts to procure 23 ads or approximately 65 per cent of all ads turned in by the chapter to the National."

Now that the advertising drive is over, a little relaxation is in order for a short period of time. However, very shortly, New Orleans will again start its drive for new members and we expect to be on top when the contest closes.

Rio Grande Valley

By Armin Doneis

In the refrigeration class, Instructor John Muller proceeded with review and clarification of Chapter 1 of the Lecture Course. He asked for five volunteers to sketch on a blackboard and discuss five basic refrigerating methods. Russell Sawyer, Earle Grass, C. L. McClaugherty, Leslie Brauner and Armin Doneis helped clarify these five points, respectively: cooling by evaporation; cooling by melting of solids; cooling by freezing mixtures; cooling by evaporation of liquids; cooling by mechanical compression system. A. M. Casberg was appointed to clarify the absorption system at a subsequent meeting.

At the following meeting, President Ray Woolrich led in a review of fundamental units and physical laws from the same book. He also gave us a brief refresher course in simple calculations of areas, volumes and velocities and did an excellent job in the absence of our instructor.

A. M. Casberg reported on the progress of the Operating Data Book Committee and again emphasized the need for all members to cooperate in soliciting advertising in this book. He also complimented the secretary for the completeness and quality of the chapter's minutes and reports in Ice and Refrigeration.

Visitors at the meetings were Thomas Flynn and N. G. Bluhm of the Hidalgo Packing Co., McAllen, and Messrs. Fleetwood and Mercer of the Alford Ice Co., Mercedes.

Dallas

By D. F. Bancook, Sr.

Recently we have had quite a discussion on absorption refrigeration systems and will give this type of system more of our time in the future. Later we expect to visit plants operating absorption systems.

Our educational committee is preparing a course of study of the type desired by our members for the fall meetings. The program at that time will devote one meeting a month to the discussion of articles and questions in Ice and Refrigeration. The other meeting will feature the course which the educational committee is preparing.

Our barbecue last month was a huge success with a membership drive included. A number of engineers and guests were in attendance and new members are joining right along. At the rate we are going now, we expect our membership to be doubled this fall.

Los Angeles

By Fred Herr

"Old Timers' Night," annually one of the most enjoyable features on the agenda of Los Angeles NAPRE Chapter, drew a full-house attendance at the Terminal Club on the night of June 15.

H. N. Royden, one of the four 2-term presidents (1928-29) the chapter has had in its 28 years of operation, served as toastmaster in introducing past-presidents, charter members and those who qualified for the title "old timer" by virtue of 20 or more years of NAPRE membership.

Introduced first was J. Wesley Lamphier, retired, who has held membership continuously since he joined as a charter member in 1922. Present were 13 of the 22 past-presidents who directed chapter affairs since its founding in the spring of 1922 when W. W. Stevens wielded the gavel as first president. Mr. Stevens, unable to attend, sent a letter of congratulations in which he wished the chapter three more decades of success.

Past presidents introduced included: J. A. Hawkins (1925-26); Mr. Royden (1928-29); H. G. Mansfield (1930-31); Ed L. Nelson (1932); E. T. Quinn (1933); Frank R. Elliott (1936); J. E. Rogers (1937); William H. Brittin (1939); W. R. Burnett (1940); Regis Gubser (1942); M. E. Bell (1946); Ralph Moore (1947); D. H. Byl (1948); and the incumbent, Rudi Kettler.

Twenty-years-or-more men introduced included John Berger of York Ice Machine Corp., who joined in 1925; William Losch of the Frick Co., who joined in Dallas, Texas, 1921, later transferring to Los Angeles; C. P. Scott, Union Ice Co. (1927); Roy L. Perry, the Perry Co., 1924; and Rudi Kettler, who said he had been paying dues since Coolidge was president.

Harlow Mansfield, now an executive with the Union Ice Co., told of how he came down from San Francisco in 1930 with the idea of helping the little chapter in Los Angeles over the rough spots.

"And now that little chapter has grown to be the largest in the organization," Mr. Mansfield said. "To me, in casting back in memory, one of the more delightful events in NAPRE activity were the Coast Conference meetings. They were conducive to bringing the chapters into closer cooperation and for providing valuable information to the members. I would like to see the Coast Conference revived at an early date."

Others called upon for brief remarks were Messrs. Lamphier, Hawkins, Quinn, Berger, Nelson and Perry, each contributing some reminiscent item which caused old timers here and there to nod their heads in pleasant memory as they, too, recalled the incident. Like the story Quinn told about the chapter meeting in the Operating Engineers Club in 1933, which he concluded with the statement, "We still would like to know who swiped the dominoes from the clubrooms that night."

Tribute was also paid to three past-presidents who passed away—J. C. Duncan, president in 1924; R. L. Benson, who died during the early months of his presidency in 1941; and beloved Jesse C. Blair, president in 1938, whose untimely death desolated West Coast refrigeration circles.

A short business session followed the reunion hour. Rudi Kettler, presiding, inducted J. W. Spears into membership. W. R. Burnett reported a total of 58 new members obtained during the current campaign, bringing total chapter membership to 315.

Elmer Johnson's last refrigeration class of the season dealt with a discussion of miscellaneous methods of refrigeration. Johnson carried the Venneman course up to the subject of air as a primary refrigerant during the first six months of the year. The course will be resumed in September.

It was announced that in a revision of plans the annual Jamboree will be held at the Los Angeles Breakfast Club on October 12. Ed L. Nelson was appointed general chairman of arrangements for this affair.

Los Angeles Chapter has no meetings scheduled during July and August. It will resume sessions on September 7 in the form of its annual Ham-and-Beans Dinner at Pacific Fruit Express Hall, at which time also the winner of a television set to be awarded by the chapter is to be announced.

Alvis Clay Is Refrigeration Inspector

ADOPTION of the new city building code by Memphis, Tenn. will require the services of a full-time refrigeration and air conditioning inspector. An announcement from the office of the City Commissioner states that Alvis J. Clay has been appointed to this position. Mr. Clay who was formerly boiler inspector is a member of the National Board of Directors of the N.A.P.R.E.

Los Angeles Engineers Plan Training Center for Refrigeration

LEADERS of the refrigeration industry of Southern California have long recognized the need for an adequate refrigeration laboratory and technical training center and reference library which would provide efficient modern facilities for training young men in the refrigeration profession. While the Los Angeles Board of Education has for a number of years offered refrigeration classes as part of the curriculum of the Frank Wiggins Trade School, the facilities have not been regarded as sufficient to provide a complete type of training.

Initial steps toward supplying the lack were undertaken in June when Arthur Hess of Hess, Greiner & Pollard, Los Angeles air conditioning engineering firm, launched a movement to solicit the collaboration of the various divisions of the Southern California refrigeration industry in providing expanded and more up-to-date training facilities.

The movement is simultaneously a tribute to the memory of the late Jesse C. Blair of Los Angeles. Mr. Blair, who died in 1948, served as refrigeration instructor at the classes sponsored at Frank Wiggins Trade School. He was tireless in his efforts through the years to make industry training available to young men. For nearly a decade he was instructor of the preliminary class of Los Angeles Chapter of the NAPRE, served on the National NAPRE educational committee, and made himself available for such activity in the ASRE and RSES.

The plan suggested by Mr. Hess calls for the establishment of the Jesse C. Blair Foundation, and the raising of an endowment to finance the acquisition of equipment for refrigeration training more adequate than that now available at the Wiggins School.

The movement has the complete support of Los Angeles Chapter NAPRE. At its last meeting before recessing for the summer, the NAPRE voted unanimously to participate in the Foundation project. Rudi Kettler, NAPRE president, named Regis Gubser of the California Consumers Corporation as chairman of a chapter committee to collaborate with Mr. Hess and committees of the local chapters of the ASRE and RSES.

The need for independent action was stressed by Emmet T. Quinn when he pointed out that while the Los Angeles Board of Education provides a classroom and instructor for the present refrigeration course at the Wiggins Trade School, it does not supply the machinery and other equipment. Mr. Quinn also reported that the Board of Education, while not in position to supply funds for additional refrigeration equipment, is completely in accord with the Blair Foundation movement and is prepared to allocate as much classroom space as will be required for the expanded courses contemplated under the Hess Plan.

The industry committee has set as its objective the raising of a fund sufficient for the acquisition of a complete set of machines, instruments and devices necessary to the presentation of a full-scale modern course in refrigeration. Needed are a refrigeration system, measuring instruments of different types, valve installations, freezer set-ups and other units for visual demonstration instruction, and other items. It is planned to acquire the necessary equipment by purchase and also to encourage the donation of equipment by public spirited individuals and firms. Also contemplated is the establishment of a modern reference library, for use by students as well as advanced personnel.

Members of the NAPRE and other groups are being requested to contribute technical books and papers, text books and printed articles dealing with refrigeration subjects, which are to serve as the nucleus of a reference library to be developed in the course of future years.

A number of meetings of the joint-industry committee were held in June and July, at which the groundwork for the Blair Foundation fund campaign was laid. Activity is to be accelerated after September 1 when the different refrigeration associations of Los Angeles and vicinity resume monthly meetings after the summer layoff.

Assisting the committee in an advisory capacity is Harry Bowe, coordinator of refrigeration apprentice training of the Los Angeles Board of Education.

All Industry Exposition

THE 6th All-Industry Refrigeration and Air Conditioning Exposition at Atlantic City, N. J., to be held from November 14 to 18 inclusive, promises to be the greatest show of its type ever held in the mechanical refrigeration and air conditioning industry. It is sponsord by the Refrigeration Equipment Manufacturers Association.

The entire main floor of the Atlantic City Auditorium, the largest in the world, will be used to house the displays of the leaders in the industry. Exhibitors now total nearly 200, occupying approximately 500 10x10 foot exhibits. Every branch of the industry will be represented. The Exposition is strictly a trade show, not open to the general public, but admission is free and open to all companies and representatives of firms affiliated with the industry.

The show offers an opportunity to see the greatest display of mechanical refrigeration and air conditioning units and parts ever assembled in one place at one time. It offers an opportunity for manufacturer, distributor, wholesaler, dealer and service engineer to compare the latest and best in every type of equipment. Not only to see and compare price and quality, but to meet and talk to representatives from every segment of the industry.

Due to the popularity of the last All-Industry Exposition, the 1949 6th All-Industry Exposition has been extended to five days instead of four. Show hours have been changed slightly. The show will be open to visitors during the following hours (with the first day limited to service engineers and contractors):

Monday, November 14—1 p.m. to 9 p.m.
Tuesday, November 15—10 a.m. to 6 p.m.
Wednesday, November 16—1 p.m. to 6 p.m.
Thursday, November 17—10 a.m. to 6 p.m.
Friday, Novembr 18—10 a.m. to 4 p.m.

ENGINE ROOM POINTERS –

Wanted: A Better Definition of the Word "Friction"

HERE is a statement concerning power transmission through belting that the writer found in a prominent engineering journal some time ago and which he considers untrue: "Some slip is necessary, since without it there is no friction between the pulley and belt and no power can be transmitted."

The statement caused the writer to do some thinking and searching, and he has come to the conclusion that the cause of the erroneous statement is doubtless due to the usual text book and dictionary definitions of the word "friction." Avery, in his Elementary Physics says: "Friction is the resistance that a moving body meets from the surface on which it moves." Nichols & Franklin say this: "A body in motion is always acted upon by dragging forces which oppose the motion and tend to bring the body to rest. This action is called friction." Webster says it is "a force acting in the tangent planes of two bodies, when one slides or rolls upon another." And Funk & Wagnalls say it is "resistance to motion due to the contact of surfaces." From the writer's viewpoint the Funk & Wagnalls definition is the correct one because it does not specify that the surfaces must be in motion for friction to exist.

For example, the accompanying sketch shows a man standing on the extreme edge of a sloping roof. He is NOT slipping. Friction between his shoes and the roof enables him to remain in that position. If he chooses he can turn around and climb the roof and unless the roof is too steep, he will not slip. If it is not friction that enables the man to stand there and then climb the roof at will, what is it? Slip, therefore, from this writer's viewpoint, is NOT necessary in order that power may be transmitted. Contact between the man's shoes and the roof is analagous to contact between a belt and a pulley. There is a difference in the *kind* of power being transmitted or conveyed in the two instances but, nevertheless, the fact remains that slip between a belt and pulley is not NECESSARY for the transmission of power although, admittedly, slip commonly does exist. Slip exists in many drives because the belt is not wide enough, or the pulley is not sufficiently large in diameter, or the belt is of inferior quality, or it is not given proper care. And so on. If the drive is properly designed and cared for, there will be no slip whatever.

But returning to the above definitions of the word "friction," it is the writer's suggestion that we develop a better one than any thus far presented. Here is one way that the writer thinks is more exact: "Friction is the resistance to motion that an unattached body meets from the contacting surface or surfaces past which it moves or tends to move." Can you suggest a better one?

What the writer wants to bring out plainly is the fact that motion is *not* necessary before we can have frictional forces. The man on the edge of the roof is held there by a "frictional grip," by "frictional resistance," by "friction of repose," or by "static friction," call it what one will, but there IS NO SLIP, and there IS NO MOTION.—F.W.S.

The Value of Exchanging Information

IN THE travels of this writer he makes contact with concerns every once in a while who ask him to "withhold information." The president will say, for example, "We don't mind showing this to you and telling you about it, but please don't publish the information. We don't want it to reach our competitors. It is our own bread and butter."

To be sure the writer does not violate the confidence of anyone like that, but he has yet to be convinced that much if anything is ever gained by such practice. The writer knows that most of these executives diligently read the magazines and are on the lookout for helpful information. In other words they are willing to take advantage of any data given to the world by others but are unwilling to give up anything in return. It is obvious that if every manufacturer in the world, from the beginning of civilization, had kept his processes "in the dark", there would be no processes at the present time—worth mentioning. In fact there would be no manufacturers—worth mentioning. We have progressed because neighbors, competitors, states, and even competing nations have "compared notes" for many years and are continuing to compare notes. We have learned much from foreign nations through the printed word, and they in turn have learned much from us, all of which is as it should be.

As an example of "information wanted", this writer has been endeavoring for some time to secure some worth while data on draft losses through water tube boilers. A great many curves, formulas and tables have been published on the subject but they all disagree with each other to such an extent and are so obviously uncertain that computations by individuals like the writer, who are wholly dependent upon such information, are decidedly unsatisfactory. If any reader has a formula or rule that will accurately foretell draft drop in inches of water the writer and doubtless many others will be delighted to see it.

In this connection, and to prove that the writer endeavors to practice what he preaches, here is a rule of the writer's own development which he has used on numerous occasions for determining the efficiency of large coal burning water tube boilers. It shows how important flue gas temperature is:

RULE: Multiply the temperature of the exit boiler gases in degrees F. by 625; divide by the heat value of the coal in B.t.u. per pound; and substract the quotient from 100. The result is the boiler efficiency in per cent.

The rule is based on the results of many thorough tests with boilers operating at their best—clean surfaces, good CO_2 conditions, ample furnace size, baffle walls tight and properly designed, setting walls tight, sufficient draft, etc. The rule is therefore a good "rule of thumb" as to whether or not a given water tube boiler is being properly operated —so this writer contends. There is no similar simple rule of thumb, nor is there a better one.—S.F.W.

Valuable Valve Kinks and "Boners"

THERE is so much talk about "saving" these days that we are inclined to become hardened and toughened and we pay little or no attention to the talk. Yet it is a fact that valves worth $5 and $10 and more are being thrown into the scrap box day after day by valve users who do not know that an inexpensive seat ring costing 50 cents or 75 cents will make the valve as good as new.

We laugh at the hired girl who told her mistress that the mechanical refrigerator was "no good." The mistress wanted to know why. "It won't make ice." said the girl. So the mistress called up the service department of the power company that had sold them the refrigerator and passed the information along to that department. Came the trouble shooter. He took a look and said to the hired girl, "The ice tray is empty. Don't you put water in it?" Whereupon the amazed girl admitted that she didn't know it was necessary to fill the tray with water in order to make ice.

All of which reminds the writer of the engineer—so-called—who didn't remove the old valve disc when the valve needed a new disc. He put the new disc on top of the old one. And then he complained to the manufacturer because the valve still leaked despite the fact that he had inserted a new disc.

So now, after having a hearty laugh at these people, let's go in and take a careful look at our own plant.

Do You Know That "Universal Motors" Are Not Efficient?

SALESMEN will often glibly say, "Yes, you can plug this machine in on either direct or alternating current and it will run without giving you any trouble". But, the salesman doesn't say anything about the efficiency of the motor. And besides, it is a fact that universal motors are less dependable than the better known and more used varieties.

It is all right to buy a machine equipped with a motor of that type if the machine is used only occasionally. On a dictaphone, for instance, or on your wife's electric sweeper, or on any tool requiring but a very small fraction of a horse power, universal motors usually work satisfactorily and the cost of the power is not of great moment, but when it comes to larger sizes the manufacturers have not yet produced a universal motor from ½ h.p. and up that will stand the gaff of continuous operation. The trouble seems to be that the motor has to turn over so fast that it veritably burns itself out. So if you propose to use your machine more or less steadily it will very likely pay you to look into the matter of efficiency and select a motor that fits into your conditions. You will then save money in reduced power bills not to mention repair bills and annoyances.

A number of years ago the writer worked for a concern that put out a machine equipped with universal motor and it cost the company a great deal of money to learn that it would continue to operate at a loss as long as it stuck to the universal motor. We "switched" motors, as they say, and then a competitor dived right in and began using the universal motor in order to undersell our company. They succeeded in underselling—for a while—but today they, too, have abandoned the universal motor. What the writer is saying here is therefore "worth money", or should be, to many a reader.

The above is inspired largely by Bulletin No. 58 which the writer now has before him. The bulletin was published by the Engineering Experiment Station of Ohio State University, Columbus, Ohio. It shows that universal motors are decidely inefficient. It says, "Maximum efficiency varies from 30 to 56 per cent, increasing with the size of the motor". It also says, "Where almost continuous operation is desired and where starting currents can be materially increased, higher efficiencies should be provided". It also comments on ball bearings vs plain bearings as follows: "Since loads are light, ball bearings do not offer much advantage over well-lubricated sleeve type bearings but do maintain a much more constant bearing friction for varying lubrication.

That latter point is a good one to bear in mind. It is a point that this writer has never seen mentioned. It means that ball bearings are less likely to be affected by different kinds of lubricant than are sleeve type bearings, and the argument sounds logical. It is a good talking point for ball bearings.—W.S.F.

"Home Made" Equipment

THE writer was invited to visit a comparatively small plant not so long ago in one of these Eastern states. The state won't be mentioned because the name of the state is of no importance, and besides the writer does not want anyone to resent this truthful article.

The most impressive thing about the plant was the abundance of "home made" transmission equipment which certainly was not very efficient. Hangers were made entirely of wooden two by fours, nailed together. Each hanger creaked loudly, and each one creaked in a pitch entirely its own, out of harmony with the others. Fortunately the shafting didn't run at a high speed or the noise would have been unendurable. Even as it is this comparatively small factory is far noisier than other factories that are many times larger in size.

As for the bearings—they were made of ordinary pipe sawed off and bolted to the wooden hangers by means of metal straps. Of course there was no such thing as "fit" between the shaft and bearings. They operated with extreme looseness and rattle. They were not babbitted. Altogether the rattling, creaking and shrieking reminded the writer of the noise one hears on Broadway in New York City every election night.

Transmission of that sort, to be sure, is decidedly inefficient. Power is obtained from a stream that flows past, but the power is insufficient for the entire needs of the plant and they are obliged to buy additional power from a central power station. The executives probably think that they are getting most of their power for "almost nothing". But not so. By installing up-to-date hangers, bearings, and shafting, the plant could be speeded up, production increased, power saved, and noise eliminated, and they would then have a factory of which they could be proud. As it is now constituted and operated they certainly are not proud of it. They "wish" they had better hangers, bearings, belting, and shafting. They "wish" they could speed up. They "wish" the plant were less noisy. They continue to "wish" they could compete more readily with modern factories.

It should be obvious to every reader that this brand of "economy" is very expensive. With such out-of-date equipment it is exceeding difficult to compete in the open market. The writer is willing to wager that they are losing enough money because of poor transmission equipment alone, to pay for several complete installations of modern transmission equipment each year.

Home made equipment is not to be scorned, but it has its limitations. If home made equipment is "rickety", as it too often is, it is apt to be symbolic of a rickety business organization.—F.W.S.

Refrigerated Warehousing Industry

NEWS • ARTICLES • ANNOUNCEMENTS

NATIONAL ASSOCIATION of REFRIGERATED WAREHOUSES

Division of American Warehousemen's Association

Executive Offices:
Tower Building, Washington 5, D. C.

Secretary, W. M. O'Keefe
Executive Vice-pres., Wm. Dalton

President, Arthur N. Otis
New York, N. Y

Vice-president, Fred F. Alford
Dallas, Tex.

Treasurer, J. L. Gagini
Omaha, Nebr.

Farm Market Facilities Finance Act Arouses Opposition

THE Farm Market Facilities Finance Act (S.2091) introduced in the United States Senate on June 16 by Senator Elmer Thomas of Oklahoma, chairman of the Senate Committee on Agriculture and Forestry, is of much interest to members of the Refrigerated Warehousing Industry. After studying this bill carefully, leading warehousemen who are familiar with the developments over a period of months that led to its introduction, are convinced that it is a serious threat to the security and progress of existing refrigerated warehouses, and a type of legislation which, if enacted, would be ruinous to many of them.

It is also felt that legislation of this character, authorizing the Federal Government to finance the construction or improvement of market facilities for perishable products, would likewise seriously endanger the business of many concerns now engaged in the perishable foods trades and particularly those owning their own properties. Banks, railroads and still other business interests would be similarly affected.

The last annual report of the U. S. Department of Agriculture Marketing Facilities Branch indicated that at the end of the fiscal year, June 30, 1947, studies of wholesale produce market facilities had been or were being conducted in 24 localities, including the following cities: Hartford and New Haven, Conn.; Cleveland, Columbus and Toledo, Ohio; St. Louis, Mo.; Baltimore, Md.; Dallas, Houston and San Antonio, Tex.; Milwaukee, Wis.; Richmond, Va.; Leesburg, Miami and Tampa, Fla.; Jackson, Miss.; Columbia and Greenville, S. C.; Atlanta, Ga.; Baton Rouge and Shreveport, La.; Benton Harbor, Mich.; and Montgomery, Ala.

It has also been reported that surveys of market facilities are to be or may be conducted in the following additional cities: Augusta and Savannah, Ga.; New York City; Kansas City; Little Rock; Denver; Memphis; Philadelphia; Rochester; Buffalo; Syracuse; Trenton, N. J., and San Francisco.

Although appropriate action is now being planned by leading warehousemen to oppose this legislation, all members of the Refrigerated Warehousing Industry are asked to read this bill carefully, talk it over with their warehousemen, get the reactions of their attorneys, discuss it with immediate company associates, bring it to the attention of their customers, and contact their senators. It is especially important that they realize that any new market facility created under this bill would be required to operate without profit, a destructive form of competition.

New Bulletin for Associate Members

THE National Association of Refrigerated Warehouses has inaugurated a new membership service, in addition to the publication of its regular membership bulletins, "Cold Facts," a special edition of this bulletin is devoted exclusively to news of the Association's associate members.

The first edition of this special bulletin has just been released to the NARW membership and allied trade groups. Articles include brief accounts of company publications, product improvement, research, company personnel, new products and services, etc.

The bulletin is designed to promote a closer and more cordial inter-industry atmosphere by offering NARW associate members the opportunity of telling refrigerated warehousemen what they are doing to serve the industry more effectively. This special bulletin complements the regular "Cold Facts" bulletins, which contain news and information about the warehousing industry, and effects a two-way exchange of news and information between the progressive members of closely allied industries. It also brings into clearer focus the vital position of the associate members as an integral part of the Association and offers them greater participation in Association activities.

Participating in this first edition are Armstrong Cork Company, Lancaster, Pa.; Birds Eye—Snider Division, General Foods Corporation, New York City; W. B. Connor Engineering Corporation, New York City; Fred Ophuls and Associates, New York City; Frick Company, Waynesboro, Pa.; C. T. Hogan and Company, Inc., New York City; Mollenberg-Betz Machine Company, Inc., Buffalo, New York; The Moto-Truck Company, Cleveland, Ohio; V. C. Patterson and Associates, Inc., York, Pa.; Refrigeration Engineering, Inc., Los Angeles, California; York Corp., York, Pa.

Folder Lists Values of Membership

A FOLDER with the title "You Should Know Better . . ." is being used by The National Association of Refrigerated Warhouses in connection with a membership drive. Its purpose is to list a few of the advantages of association membership. These points are listed as follows: Listing in Directory; Annual Conventions; Receipt of Special Reports and Membership Bulletins; Standing and Special Committees; Tailor-Made Information Service; Representation in Washington; A Public Relations Program; Access to Advice and Experience; Prestige and Distinction; Access to Services and Facilities; Two for One Membership; NARW Membership Doesn't Cost—It Pays.

Association Makes Industry Survey on Group Insurance

FOLLOWING the announcement, as published in the July ICE AND REFRIGERATION of a plan by the National Association of Refrigerated Warehouses to offer group insurance to member companies, comments have indicated a wide interest in the proposal. As stated, the plan would be operated through the association office and a board of trustees appointed to administer it, with the policies being written by one of the larger insurance companies.

To get a representative expression of opinion the association is mailing a bulletin with a short post-card questionnaire, asking each company for information as to whether they are interested, and the number of employees. A complete return of all these post-cards, whether expressing interest or not, is essential as the basis for deciding whether to go ahead with the project.

The bulletin lists a number of advantages as follows:

Considerably reduced premiums for this type insurance made possible by the large numbers insured under a group plan.

Advantages of group insurance to small concerns with less than 25 employees, which are ordinarily not eligible for group insurance on their own.

Concerns with plans of this type in effect attract a more reliable, higher type of employee.

No physical examination or health certificate required.

Creates feeling of security and well being for employees which means higher morale, better work, greater loyalty.

Some states now require employers to carry health and accident insurance for their employees. Any plan adopted would meet requirements of all state laws and be applicable nationally.

Many unions are now demanding such protection for their members. An association group plan might be less expensive.

The plan will be self supporting when in full operation.

N.A.R.W. Offers Services in Grain Storage Shortage

THE National Association of Refrigerated Warehouses is taking an active interest in alleviating the reported shortage of grain storage space by extending its services and the facilities of its members to the U. S. Department of Agriculture, Grain Storage Branch and the Commodity Credit Corporation.

During the grain storage emergency last season, NARW surveyed its membership and located storage space for 500-600 carloads of dried peas and beans. It is understood that these commodities are frequently stored in bins which are also suitable for grain storage. By sacking these peas and beans for storage in regular warehouse space, the bins could be freed for grain storage. The storage situation last year turned out to be less serious than at first anticipated and reportedly resolved itself without too much difficulty. No reports of this space ever having been used for this purpose reached the association.

This year with the grain storage situation reportedly more acute than ever, the NARW office has again offered to cooperate in any way possible with USDA in alleviating the grain storage shortage. With refrigerated warehouse occupancy at near record lows, more space than ever could be found. The NARW office is holding itself in readiness to again survey its membership for space and is alerted for immediate action whenever needed.

Interested individuals or groups may receive further information by contacting the NARW headquarters at 608 Tower Building, Washington 5, D. C.

Publicity Release on the Weather

A SPECIAL publicity release was issued by the National Association of Refrigerated Warehouses during the early July heat wave, talking about the weather and kindred subjects, as follows:

According to an announcement from N.A.R.W. in Washington, that city is a shambles of wilted waist-lines, shrunken seersuckers, and woebegone women. The thermometer has just boiled over, and the humidity has risen to a new high.

The prestige and patronage seekers of the Temple-on-the-Hill have scrambled down to claw at the ivory gates of the weatherman's palace. The Bureau of the Weather has ascended to a new pinnacle in our bureaucratic Utopia.

The pleasure seekers—lured to the summer wonderland of the peaceful Potomac—have folded and are viewing the capitol dome, the Washington monument, and the DC-6's from the air conditioned encasements of the D.C. hostelries.

Great national issues of the day are relegated to a mere second place—in favor of HEAT, that greatest of all national issues. Communism is not even a popular subject, and even sin commands few if any headlines. It's too hot.

Senators and Congressmen have abandoned the banners of righteous indignation and now carry aloft the dogma of the popsicle and the frozen pie.

All of which reminds us. Are you going out after this business? And more, too?

Cold Storage is King!! Long Live the King!

Great Lakes Chapter to Meet at Mackinac Island

A MEETING of the Great Lakes Chapter of the National Association of Refrigerated Warehouses will be held at the Grand Hotel, Mackinac Island, Mich., Friday to Sunday, August 19 to 21. The middle of July some 28 reservations had been made and most members will be accompanied by their wives and other members of their family. A number of them plan to spend a few additional days on the Island either before or after the meeting. The program will be made up of the usual general discussion of the refrigerated warehousing situation. R. M. Conner of the United States Cold Storage Corp., Chicago, is Chairman of the Chapter.

Campaign Brings in New Members

A CAMPAIGN for new members started the latter part of May by the National Association of Refrigerated Warehouses has resulted in several new applications being received. Among recent additions to the membership roll are:

The Carey Ice & Cold Storage Co., Hutchinson, Kans.
Scottsbluff Ice & Storage Co., Scottsbluff, Nebr.
Independent Cold Storage Co., Lubbock, Texas.
Southwest Ice & Dairy Products Co., Enid, Okla.
Liberty Ice & Cold Storage Co., Galveston, Texas.

O'Keefe a New Grandfather

WM. M. O'KEEFE, secretary of the National Association of Refrigerated Warehouses is receiving congratulations on having become a grandfather—for the third time. Parents of the new granddaughter are Mr. and Mrs. Wm. M. O'Keefe, Jr., of Chicago. Late reports indicate that Grandfather is doing as well as could be expected.

How to Keep Employees Informed

HOW much do your employes know about their company? Pick one at random and ask him, "How many cubic feet of refrigerated space in the plant?" "Who are our closest competitors?" "How many employee benefits does the company offer?" "How much is invested in the company?" "How many people (stockholders) own the company?" If the answers you get are typical, you'll be amazed at how little your employees actually know about your company and its operations. Your employees cannot think and act right unless they have the facts. It's up to the management to tell them through effective employee-employer communications.

As an example, when asked in a separation interview why he wanted to quit his job an employee said "The company across the street has more employee benefits." Actually it hadn't and what worried the company management was how the employee got this false impression. The company had plenty of literature on company benefits, all of which had been made available to this particular employee. Investigation showed the pamphlets were all extremely dull; no illustrations; heavy subject matter; pamphlets were given an employee all at once; there was no systematic follow up.

The moral of this is that employee publications must be made interesting and attractive. Give employees the story of employee benefits in easy doses. Keep telling them about benefits. Try mailing the pamphlets to their homes.

—N.A.R.W. Bulletin.

For Cockroaches Try Chlordane

SUPERFLUOUS tenants known by some as "water bugs" and by others as just plain cockroaches may be eradicated with chlordane, the newest and most effective insecticide recommended by U. S. Department of Agriculture. It is also effective for certain kinds of ants. This preparation is for sale in many stores but the purchaser is advised to be sure that 2 per cent chlordane is among the ingredients listed on the container. Oil-base sprays are transparent, often slightly straw color; water-base sprays are milking white. Both evaporate leaving an invisible, odorless film on surface which kills pests on contact and lasts weeks or even months. It should be directed only on places where insects crawl, hide or enter; use spray or brush. Do not apply on or near food packages.

New York Association Elects Officers

THE New York State Association of Refrigerated Warehouses at a meeting held at Rochester recently elected officers for 1949. They are as follows:

President, Garth A. Shoemaker, Elmira, N. Y.

First Vice-president, Weston M. Rider, Germantown, N. Y.

Second Vice-president, Frank H. Field, Jamestown, N. Y.

Secretary, Charles G. Ashe, East Aurora, N. Y.

Treasurer, Ralph C. Stokell, New York City.

Executive Committee: Richard Doncaster, Holley; William M. Scott, Rochester; W. Edward Bishop, Sodus; J. C. Posson, Medina; Francis H. Blake, Waterport; Charles E. Eells, New York City.

Plans are being developed for a summer meeting of the Association to be held at Bellhurst, just outside of Geneva, N. Y. Arrangements are in the hands of Frank H. Field. A definite date has not been established for the get-together but it is planned for sometime in August.

Old Brewery Caves Now Used for Storing Vegetables

MORE than 90 years ago the brewery firm of Georgil & Schumann used caves for beer cooling in the Prairie du Chien area, on the Mississippi River in Wisconsin. This was done for many years, as a temperature of about 47 F was available in the caves, without artificial refrigeration. Ventilators in the upper part of the arched stone walls circulated the air and prevented dampness. It is said that one of the large caves could hold enough beer in storage to supply the needs of the populace for many months. The caves ran far back into the hills off what is now Highway 27, just east of the present Prairie du Chien city limits.

Now a new use has been found for these caves which are still intact. The Badger Wholesale Grocery Co. of Prairie du Chien has leased one of them and has installed huge bins, shelving and other equipment so that vegetables, fruits and produce can be stored. The size of the cave permits storage of enough fruits and vegetables to supply the dealers in southwestern Wisconsin and northeastern Iowa, on the other side of the Mississippi River.

New Food Storage Plant at Lafayette, Indiana

A MODERN refrigerated warehouse of 8 to 10 million pounds capacity is being erected at Lafayette, Ind. by Continental Freezers, Inc. a wholly owned subsidiary of Lafayette Foods, Inc. Construction began in July on the new single floor plant designed principally for freezer storage. It is located on a 96 acre tract at the east end of the city. The property is served by excellent rail connections and adjoins express highway, U. S. 52.

The parent company, a large producer of frozen foods is headed by Thomas Gould, president, Lafayette. President and general manager of Continental Freezers, Inc. is K. F. Stepleton, for a number of years engaged in refrigerated warehouse operations in Chicago. The new plant will engage in general cold storage business with particular emphasis on frozen foods and storage in transit.

Milwaukee Warehousemen's Strike Ends Union Agrees to Arbitration

THE strike affecting refrigerated warehouses in Milwaukee, Wis., which started May 17 was terminated June 18 at the end of the fifth week. The unions involved, the A.F.L. Truck Drivers No. 200 and Local No. 815 of the A.F.L. Longshoremen, agreed to arbitrate both wages and hours.

The original demand by the strikers was for seven cents an hour increase and that a guarantee of 44 hours work per week be continued. The arbitration board was scheduled to meet during the week of July 18 at which time it was expected that an agreement would be reached. During the strike engineers were ordered off work by the union.

Refrigerated Warehousing Information

A LIST or subjects pertaining or relating to refrigerated warehousing has been compiled and issued by the National Association of Refrigerated Warehouses. More than 60 subjects are listed, representing research work and surveys and experience of many warehousemen.

Storage of Carrots

A FACT file sheet summarizing information on the refrigerated storage of carrots has been issued by the Refrigeration Research Foundation.

Although fresh carrots are not frequently held in cold storage, they do respond to careful handling and low temperature, with high humidity. Cellars or banks are used in some areas and they keep carrots satisfactorily for winter storage, particularly because relative humidity is ordinarily kept high (95%) in such storage. Very light freezing will cause practically no injury. High humidity is necessary to prevent wilting and drying out.

In preparation for storage carrots should be topped. All misshapen and injured roots should be sorted out. Injured roots are likely to cause the development of the diseases called watery soft rot and bacterial soft rot. Ventilated containers are necessary, such as slatted crates. Provision for free movement of air is necessary.

With bunch carrots it is necessary that the tops do not become packed tightly because there is danger of heating from respiration. Heating causes foliage to become yellow or discolored. Foliage will discolor sooner if warm and wet than if kept cool and dry. Careful icing is effective and can be used on bunch carrots for perhaps a week if they cannot be cold-stored.

Common Market Diseases

Freezing: Roots flabby. On being cut they show radial cracks in central part, tangential cracks in outer part.

Bacterial soft rot: Soft mushy spots, sometimes smelly because of secondary invaders. Control: Careful harvesting and sanitary handling. Avoid bruising. Refrigerate promptly.

Black rot (Alternaria): Fairly firm black decay at crowns, sides, and tips. Control: Avoid bruising. Refrigerate promptly.

Gray mold rot (Botrytis): Fairly firm but semi-watery decay, grayish-brown velvety spore masses. Control: Sanitation. Avoidance of bruises. Decay continues at 32 F., but refrigerate promptly.

Rhizopus soft rot: Very watery decay but not as watery as bacterial soft rot. Coarse mold and "nesting" common. Control: Avoid injury. Refrigerate promptly. Maintain sanitation.

Watery soft rot: Watery rot with fine white "cottony" mold and large oval black sclerotia. "Nesting" common. Control: Culling, sanitation, and prompt, continuous refrigeration.

Summary of Storage Conditions

Temperature, 32 F.

Relative humidity: topped 95 - 98 percent; not topped, 85 to 90 per cent.

Storage period: 4 - 5 months under good conditions; not topped, 10 days to two weeks. Tops will retain fresh appearance if not crowded.

Storage of Frozen Pork Loins

A SECOND 72-week storage study of frozen pork loins has been completed at Kansas State College under the direction of Refrigeration Research Project No. 11, and another manuscript is in preparation. Roasts were stored at 0 F., -10 F., and -20 F., and data on chemical composition and palatability changes have been analyzed. At -20 F. the desirability of fat and lean pork declined only slightly in this period. Rate and time of changes at the two higher temperatures are indicated by the data.

Storage of Peaches

A FACT file sheet on the storage of peaches, covering temperatures and common market diseases, has been issued by the Refrigeration Research Foundation.

Peaches are regarded as not well adapted to cold storage, but the advantages of being able to hold this fruit during peak loads in the canning and shipment seasons are great. Varieties differ in suitability for cold storage. Tuskena (Tuscan) (8 weeks), Early and Late Crawford, and Salwey (4 weeks), and Elberta and J. H. Hale (3 to 4 weeks), are varieties and storage periods for those most suitable for storage, according to USDA Circular 278, by Rose, Wright and Whiteman. This circular lists Belle, Champion, Hiley, and Carman as being less desirable storage varieties.

In extensive studies of freestone canning peaches in the Pacific Northwest, Neubert and Veldhuis have considered low-temperature storage. For Elbertas, storage at 31 F. was found more satisfactory than at 37 or 45 F. Degree of maturity at harvest was found to be particularly important. They found that fruit to be stored should be harvested at a maturity requiring 5 days or less to reach canning ripeness.

Common Market Diseases

Cold storage injury: Dryness, mealiness, loss of flavor. Breakdown starting around pit is grayish brown, water-soaked, mealy. Control: Refrigerate at 31-32 F. and store only 2-4 weeks, depending on variety.

Brown rot (Sclerotinia): Extensive firm, brown, unsunken decayed areas turning dark brown to black in center and early covered with dusty spore masses yellowish in color. Skin clings tightly to center of old lesions. Control: Control disease in the orchard. Prevent punctures caused by insects and otherwise. Refrigerate promptly to as near 32 F. as possible.

Pustular spot (Coryneum): Common on peaches from West, occasionally on eastern fruit. At first small purplish-red spots, later up to one-fourth inch diameter, brown sunken with white center. Control: Control with orchard sprays. Cool harvested fruit to below 45 F.

Rhizopus rot: Extensive, fairly firm, watery decay with uniformly brown surface color. Skin slips readily from centers of lesions. Coarse mycelium with black spherical sporangia develops under moist conditions. Control: Cool promptly to below 50 F. Prevent skin breaks.

Summary of Storage Conditions

Temperature, 31 to 32 F.
Relative humidity, 80 to 85 per cent.
Storage period, 10 days to 4 weeks.

Canadian Cold Storage Holdings

THE DOMINION Bureau of Statistics of Canada, Agricultural Branch, reports the following commodities held in cold storage on June 1, 1949, as compared with June 1, 1948, and May 1, 1949.

Apples in cold storage on June 1, 1949, amounted to 143,923 bu. as compared with 274,995 bu. June 1, 1948, and 362,648 bu. May 1, 1949.

Frozen fruit holdings in storages and factories June 1, 1949, amounted to 11,040,000 lbs. as compared with 6,617,000 lbs. June 1, 1948, and 12,870,000 lbs. May 1, 1949.

Stocks of frozen vegetables in storages and factories on June 1, 1949, amounted to 3,588,000 lbs. as compared with 3,124,000 lbs. June 1, 1948, and 3,764,000 lbs. May 1, 1949.

Cold Storage Holdings—Coolers Remain Same Freezers Show Decline

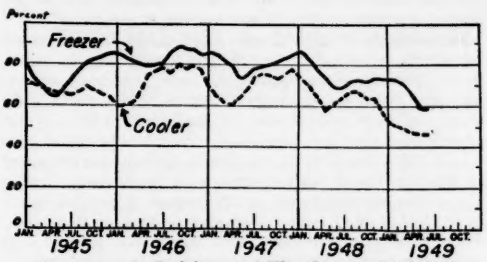
OCCUPANCY in public warehouses continued to decline during May. For the first time since data have been gathered cooler occupancy failed to show the customary seasonal May rise. Public cooler occupancy stood at the same point as a month ago, 49 per cent. For the first time on record freezer occupancy declined during May. June 1 public freezer occupancy was 59 per cent. The May decline in the use of freezer space is in contrast to a normal rise of from 2 to 3 points.

TABLE I—COLD STORAGE HOLDINGS IN PUBLIC WAREHOUSES—BY COMMODITIES (000 OMITTED)

	June 1, 1949	May 1, 1949	June 1, 1948	Five-year Average
Meat and meat products, lbs.	681,356	791,409	790,039	713,434
Lard and rendered pork fat, lbs.	128,044	138,216	150,660	179,896
Frozen poultry, lbs.	77,571	89,205	117,935	148,113
Creamery butter, lbs.	49,200	15,338	18,638	40,595
American cheese, lbs.	114,336	109,920	106,712	114,223
Other cheese, lbs.	15,854	14,458	15,054	18,883
Shell eggs, cases	1,944	954	4,903	6,420
Frozen eggs, lbs.	141,729	107,058	248,574	244,096
Apples, bu.	1,306	3,318	1,855	1,327
Frozen fruits, lbs.	299,643	237,419	250,326	226,500
Frozen vegetables, lbs.	185,063	191,666	160,423	142,372
Frozen fish	92,060	74,940	85,601	72,049

Both cooler and freezer space utilization on June 1 appeared to be uniformly low in all geographic areas when compared with occupancies of the latest five years. June 1 occupancy in both coolers and freezers was second only to the record low in 1940, the first year data were gathered. Little change in the utilization of storage space in meat-packing plants and private storages occurred during May. Occupancy in private warehouses and meat-packing plants dropped but 1 point, with the exception of a 5-point drop in private warehouse freezers.

Warehouses reported 2.4 billion pounds of foodstuffs in storage June 1. This quantity was below stocks reported in cold storage for any June 1 since 1943. Cooler commodity weights were 150 million less than a year ago. Lard was withdrawn contra-seasonally. Such commodities as shell eggs and cheese moved into storage in below average quantities. Withdrawals of apples and pears were about normal, but the out-of-storage movement of meat items was well above average. These combined trends readily account for the failure of cooler space occupancy to rise during May.



Occupancy in Refrigerated Warehouses, 1945-1949

The 1.3 billion pounds of foodstuffs in freezer were some 222 million pounds less than at the same season last year. The May net withdrawal of 21 million pounds of freezer items was due largely to items such as pork, beef, poultry, and frozen fruits and vegetables moving from storage. The fruit and vegetable stocks decline was about normal. Meat withdrawals were over three times the average, while poultry withdrawals were about half average May withdrawals. In-movements of butter were greater than average, but those of cream and frozen eggs were well below average.

TABLE II—PERCENTAGE OF SPACE OCCUPIED BY PUBLIC COLD STORAGE WAREHOUSES (APPLE HOUSES EXCLUDED)

	Net Piling Space (000 cu. ft.)		June 1, 1949 (%)		May 1, 1949 (%)		June 1, 1948 (%)		5-Year Average (%)	
	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer
New England	3,561	6,327	34	69	42	58	53	58	70	67
Middle Atlantic	42,086	33,798	41	52	40	51	55	62	67	77
East North Central	36,040	28,304	56	59	52	62	74	78	77	76
West North Central	11,006	16,733	57	70	53	69	78	83	80	79
South Atlantic	11,634	6,368	60	75	53	77	73	73	78	82
East South Central	4,199	3,847	69	85	68	81	83	81	87	83
West South Central	7,241	5,195	66	56	73	59	70	75	80	83
Mountain	2,150	2,707	60	62	71	63	80	81	85	84
Pacific	18,936	21,462	35	51	46	53	52	55	57	65
United States	136,853	124,741	49	59	49	60	65	70	72	76

TABLE III—PERCENTAGE OF SPACE OCCUPIED BY PRIVATE AND SEMI-PRIVATE REFRIGERATED WAREHOUSES AND MEAT PACKING PLANTS

	Private and Semi-Private Warehouses						Meat Packing Establishments					
	Net Piling Space (000 Cu. Ft.)		Space Occupied—Per Cent June 1, 1949		May 1, 1949		Net Piling Space (000 Cu. Ft.)		Space Occupied June 1, 1949		May 1, 1949	
	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer
New England	554	1,113	39	63	39	63	1,968	725	85	.....	81	.....
Middle Atlantic	3,293	4,430	40	41	42	59	6,731	740	89	69	90	80
East North Central	5,779	2,576	64	41	56	44	15,885	6,591	88	64	90	63
West North Central	2,123	3,929	75	83	91	66	25,718	10,549	88	89	88	91
South Atlantic	647	1,377	10	73	12	77	2,377	609	95	100	95	99
East South Central	190	101	100	.....	100	.....	2,014	403	84	90	85	91
West South Central	700	764	30	36	40	11	3,570	1,452	100	100	100	100
Mountain	182	654	90	99	90	31	2,028	666	97	98	98	100
Pacific	5,383	6,554	14	40	14	46	4,056	1,152	91	86	94	84
United States	18,851	21,498	49	47	44	53	64,347	22,887	89	79	90	80

Frozen fruits and vegetables comprise the bulk of the fruit and vegetable items stored at this season. Both frozen fruits and vegetable stocks declined during May. Only two frozen fruit items showed net increases during the month —strawberries and fruit juices. Strawberry stocks which customarily rise by about 20 million pounds from May to June, rose only 9 million this year. The 45 million pounds in storage, however, were above average and a year ago holdings. Frozen vegetables in storage totaled 185 million pounds which was above average and a year ago. Asparagus, broccoli, and spinach had net in-movements during May, while other vegetable items showed withdrawals.

Net movements of both fruits and vegetables approximated average May withdrawals. Only about 1⅓ million bushels of fresh fruits were left in storage on June 1. Dried and evaporated fruits were considerably below average. Potatoes, onions, and other fresh vegetables, except for celery, showed marked May declines in stocks.

A million cases of shell eggs moving into storage during the month brought June 1 stocks to 1.9 million cases. Stocks did not increase at the normal May rate. The in-movement was only half that normally expected, while stocks were about one-third normal and less than half those of a year ago. The lowest previous June 1 record holdings of eggs was in 1916, the first year in which figures were compiled at which date 4.6 million cases were in storage. Frozen egg stocks likewise failed to accumulate in normal quantities during May. The 35-million-pound in-movement, which placed June 1 holdings at 142 million pounds, was 22 million pounds less than average. Stocks were only a little more than half average June 1 holdings.

Some 78 million pounds of frozen poultry were on hand in United States warehouses June 1. May withdrawals were less than half those of the 1944-48 average. Butter stocks increased by 34 million pounds to 49 million pounds in storage on June 1. The in-movement was well above average and stocks were greater than a year ago by 30 million pounds. Refrigerated holdings of cheese—132 million pounds—were what is normally expected for this season of the year.

During May, 110 million pounds of meats and meat products were withdrawn from storage. This was more than 3 times the average May to June withdrawal and was the second largest on record for this time of year. The largest withdrawal during May was reported in 1937 when 137 million pounds moved from storage. Beef in storage on June 1, at 88 million pounds, reflected a net withdrawal of 20 million pounds since last month, of which 19 million pounds were frozen beef. Pork stocks down to 473 million pounds on the first of the month were only 7 million pounds below the average holding for this time of year despite a record stock reduction of 72 million pounds during May. Frozen pork holdings on June 1, however, were above average. Lard and rendered pork fat stocks were reduced by 10 million pounds, whereas normally there is an increase during this period. Stocks on hand June 1 totaled 128 million pounds compared with 150 million pounds on hand last year this time and average June 1 stocks of 180 million pounds.

A 17 million pound net in-movement during the month brought total stocks of frozen fishery products to 92 million pounds on June 1. First-of-the-month holdings were above average for this time of year by 20 million pounds.

Storage Outlook

At midyear less than half of the refrigerated space in public coolers was utilized for commodity storage. The June 1 occupancy of 49 per cent was 16 points below the level reported in June 1948 and was as much as 23 points below average for this time of year. The normally expected increase in cooler use during May did not materialize and the level reported on the first of this month was at a near record low. The failure of cooler occupancy to increase during May can be explained in part by the relatively smaller amounts of shell eggs and cheese moving into storage than is normally expected for the time of year, coupled with the contra-seasonal withdrawal of lard from cooler storage facilities. Unless cooler occupancy rises as much as 3 points by July 1, and that is more than the average (1944-48) June to July change, public cooler occupancy will be at the lowest July 1 level since records were kept in 1940.

Freezer occupancy in public warehouses continued to decline in contrast to a normally expected increase from May to June. The decline brought the level of occupancy —59 per cent—to within one percentage point of the record June 1940 low of 58 per cent. It is probable that freezer occupancy has reached its seasonal low and that it will be on the upswing cycle during June. If the historic data is an indication of the expected increase during this month, then July 1 occupancy should be as much as 2 points above the occupancy reported on the first of June. Because of the contra-seasonal movement experienced during May, however, the expected July 1 occupancy will set a record low unless, of course, a greater than average increase should obtain during the month.

Cold Storage Stocks of Selected Frozen Fruits and Vegetables

STOCKS of frozen peaches, raspberries and strawberries in storage June 1 amounted to 69 million pounds, according to a report by the Production and Marketing Administration of the U. S. Dept. of Agriculture. Sixty-three per cent of this total were classified as to container size. This coverage equals the record low in August, 1947, the first month packaging data were reported. The ratio of consumer-sized packages to larger cartons remained unchanged from a month ago with 33 per cent of the peaches, 12 per cent of the raspberries and 24 per cent of the strawberries reported in retail packages.

COLD STORAGE STOCKS OF FROZEN FRUITS AND VEGETABLES IN STORAGE JUNE 1 AND MAY 1, 1949 IN PACKAGES OF ONE POUND OR LESS (000 OMITTED)

	June 1, 1949		May 1, 1949	
	Lbs.	Pct.	Lbs.	Pct.
Peaches	2,470	33	2,991	33
Raspberries	1,105	12	1,427	13
Strawberries	6,690	24	5,752	23
Asparagus	3,019	67	1,289	54
Beans, lima	9,818	62	11,771	62
Beans, snap	3,640	65	4,550	65
Corn, sweet	2,276	62	3,153	57
Peas, green	15,385	67	18,099	67
Spinach	8,754	78	6,635	71

Coverage on the selected frozen vegetables set a record low with 50 per cent of the 127 million pounds in storage reported as to container size. This is 4 points below last month's coverage and 10 points below that of June, 1948. Asparagus and sweet corn showed an increase over May of 13 points and 5 points respectively in the percentage of retail packages in storage. Consumer sized packages of spinach increased from 71 to 78 per cent in comparison with a decrease of 5 points at this time last year. Retail packages of lima beans, snap beans and green peas were in the same ratio to larger containers as they were last month.

Frozen Foods
Reg. U. S. Patent Office
COVERING EVERY PHASE OF THE QUICK FREEZING OF PERISHABLE FOODS—PREPARATION, PACKAGING, FREEZING, STORAGE, DISTRIBUTION, DESIGN, CONSTRUCTION, EQUIPMENT, OPERATION OF LOCKER PLANTS.

Tenth Annual Frozen Food Locker Convention Stevens Hotel, Chicago, August 28-31

THE tenth annual convention of the National Frozen Food Locker Association will be held at the Stevens Hotel, Chicago, Sunday through Wednesday, August 28 to 31. This will be the first all-locker operator convention, the Frozen Food Locker Institute having decided to hold its own convention and exposition this year, on October 3 to 6 at the Sherman Hotel, Chicago.

There will be the usual exhibits of locker supplies and equipment in the large exhibit hall of the Stevens and late word indicates that the reservations for exhibit space are very satisfactory.

Convention Clinics

The program for the business sessions will be made up of new features on practical locker operating problems. Of oustanding interest will be a series of clinics in which successful operators will explain their operations and techniques. The subjects to be covered include:

Operating Cost and Income: "How I reduced my labor costs per dollar of processing;" "How I increased net profit last year;" "My plant operating cost and income last year."

Home Units and the Locker Plant: "Renting home units —how I do it;" "How I make money servicing home unit owners."

Processing, Packaging and Merchandising Frozen Fruits and Vegetables: "How I sell commercial pack fruits and vegetables to my customers."

Selling Frozen Fish and Seafoods: "Why I think fish and seafood sales are a natural for the locker plant."

Poultry Processing and Merchandising: "Poultry processing and dressing—how I make money at it."

Slaughtering Clinic.

Meat Cutting and Wrapping Clinic: Speed wrapping demonstrations.

Curing, Smoking and Lard Rendering.

Advertising: "How I advertise and hence sell my lockers, my merchandise, and processing services to my community;" "Why I think radio is good advertising;" "How I make newspaper advertising pay off;" "How my direct mail campaign pays off."

Contests and Demonstrations

A new feature this year will be the first annual national ham show and contest to be held Monday afternoon, August 29. Four classes will be open to locker operators seeking top national honors with full cured and light cured hams in the 12 to 16 lb. and the 16 to 20 lb. groups. Judging will be done by three recognized experts on ham curing and quality.

Another feature will be a wrapping demonstration and competition. Selected teams from locker plants will compete for honors as wrappers, with a board of experts on hand to judge their work.

Packaging of fruit and vegetables will be discussed and demonstrated. New types of containers will be on display and locker operators will be able to actually see which of these is best fitted to serve the needs of their patrons.

Discussion of lockers plant merchandising methods and advertising technics will be at the purely practical level. Locker operators who have tried merchandising ideas will tell how they did it and what results were achieved. Those who want to sell more fruits and vegetables will have an opportunity to discuss this subject with successful operators. Men who have doubled their sales of frozen fruits will tell how they did it last year and how they plan to do it again this year.

Advertising discussions will be given by locker operators who have used newspaper, direct mail and radio. Each of them will have something to say about how these media helped increase sales at their plants. These speakers will be men who have done profitable advertising and they will pass along their ideas and experiences.

Another feature of the convention will be the discussion of a program for frozen food cooking schools. This will include a talk on "How we talked lockers to 1,000 women at cooking schools." This effective merchandising method has been exploited by many locker operators who have found it to be one of their best business builders. Many of the men who have worked in programs of this sort will be on hand to tell what they did, the mistakes they made, and how they tied the program up with an effective selling campaign.

There will be a demonstration of the best meat processing methods and after that operators will be asked to try and stump the experts with questions. Talks will include actual case histories of locker operators who built their processing operations into big business. They'll tell how to reap extra profits from processing and how to sell this service to patrons.

Fruit and vegetable processing will be discussed and the

best methods will be shown. There will be talks about which types of fruits and vegetables freeze best and how to educate patrons to the proper use of preservatives. Efficient plant layout for fruit and vegetable processing both by the plant staff and by patrons will be shown and discussed.

A special program has been arranged for the ladies attending the convention. It includes a conducted tour of the Merchandise Mart, a tour of the Marshall Field Department store, a day's cruise on Lake Michigan.

Informal Hearings on Standards for Frozen Asparagus and Peas

A PROPOSAL that the government withhold action on calling formal hearings on proposed mandatory federal standards for frozen asparagus and frozen peas at least until the fall of 1950, was made by frozen food industry representatives to the Food & Drug Administration. The FDA's Food Standards Committee called an informal meeting of food processors and frozen food packers at Washington June 28 to consider suggestions and recommendations on standards for the two frozen vegetables.

Officials of the National Association of Frozen Food Packers who testified for the industry at the informal session, proposed that if formal hearings are to be held, those for asparagus be scheduled no earlier than the fall of 1950, and those for frozen peas be put off until the fall of 1951.

The Frozen Food association spokesmen added that the asparagus hearings should be held first, since there are fewer problems involved in setting standards for this item, and more data are available. It was recommended that hearings on frozen asparagus standards be held separately from any hearings on canned asparagus.

W. A. Queen, chief of the division of state cooperation of the Food & Drug Administration presided at the session. Also representing the FDA were Joseph Callaway, secretary of the FDA Food Standards Committee, and Dr. W. B. White, chief of the food division.

Kenneth Dykstra of the Birds Eye-Snider division of General Foods Corp., who heads a food standards committee of the NAFFP, made the frozen food packers' recommendations. He was supported in his views by Lawrence Martin, NAFFP secretary-manager, and A. W. Dutcher, new technical director of the Association.

In a general statement on frozen vegetable standards, the Association stated its view that standards should apply only to the finished product, and should not attempt to describe the manufacturing process. The Association also recommended that the current "voluntary" grades of quality prescribed by the Department of Agriculture's Production and Marketing Administration should not be considered any measure for determining standards under the Food, Drug and Cosmetic Act.

The mandatory frozen vegetable standards the government is considering would be the first of their type for frozen vegetables. The Food & Drug Administration has already drawn up a series of standards for frozen fruits and berries, which are expected to be issued in the near future and be applicable to the 1950 pack.

Mr. Callaway at the conclusion of the informal sessions on frozen vegetables indicated that pressure of other business would prevent the Food and Drug Administration from calling formal hearings on asparagus and peas until some time next year. However, he asked interested parties to file written memoranda and recommendations in the meantime. The Administration itself made no specific proposals to the meeting. Mr. Callaway said his staff had "no preconceived ideas" on the standards issue, but wanted to get recommendations from the industry.

Refrigeration Equipment Manufacturers

AT A MEETING of the Food Freezer Section of the Refrigeration Equipment Manufacturers' Association held in Washington, D. C., May 25, Howard R. Roberts, Whiting Corp., Chicago, Ill., was elected Chairman. Other officers elected were J. W. Krall, Tyler Fixture Corporation, Vice Chairman, and C. H. Beane, Brewer-Titchener Corporation, Secretary. They will hold office until May 1, 1950.

A comprehensive program for the coming year was discussed at length and initial steps have already been taken to put the program into effect as rapidly as possible. Projects slated for early development include a promotional campaign on food freezers. This will involve the preparation of a sound slide film in color which will be available for use in all schools, colleges, universities and other institutions having courses in home economics.

A speakers bureau is also planned by means of which organizations, groups, service clubs, etc., may arrange for speakers on various phases of the food freezer subject through the Washington headquarters of the Association.

The desirability of preparing standards covering the manufacture of food freezers for review and publication by REMA was discussed. It was proposed that such a set of approved standards be adopted and that a standard label also be developed, the label to be used on food freezers of their manufacture by all members of the Section, and publicized in their advertising.

To initiate action on this project, W. L. Currie, Chief Engineer of Victor Products Company, was appointed as chairman of an Engineering Standards Committee with authority to select four other members from the Food Freezer Section of REMA to study existing standards on food freezers, including those developed by NEMA and ASA, following which it is to prepare a basic standard for consideration and adoption by the Section.

This Section of REMA had formerly been called the Home and Farm Freezers Product Section. Feeling that the section was not properly named, it has been changed to "Food Freezer Section." Food freezers are used in many locations other than homes and farms and it was thought this new name would be of broader application and more fitting for the activities of the group.

USDA Announces Frozen Concentrated Juice Standards

THE U. S. Department of Agriculture has announced that U. S. Standards for grades of frozen concentrated orange juice, scheduled for publication in the Federal Register June 24, will become effective in 30 days after such publication.

The published standards are based on studies made of frozen concentrated orange juice, concentrated under high vacuum at low temperatures and standardized to 41.5 to 43.5 degrees Brix (technical term for measurement of concentration), without the addition of any ingredients other than fresh orange juice.

This product, the Department reported, packed and handled properly and after being reconstituted by adding three parts of good water to one part of concentrate, reflects color, flavor and body substantially the same as freshly extracted orange juice.

The Department, in establishing these standards, pointed out that there are other types of frozen concentrated orange juice, including a sugar-added type. Sufficient data have not been submitted to justify making provisions for the addition of sugar or incorporating requirements for other types of frozen concentrated orange juice, but the Department will consider making further studies of such other types with a view of developing standards for them.

Shipments of Air Conditioning Equipment During 1948

SHIPMENTS of complete air conditioning equipment and components and accessories for air conditioning and commercial refrigeration equipment during 1948 were valued at $216 million according to the Bureau of the Census, Department of Commerce. This represents a decrease of 8 per cent from the $234 million of this equipment shipped during 1947. Components and accessories for air conditioning and commercial refrigeration equipment amounted to $163 million, or 75 per cent, of the total value of 1948 shipments; complete air conditioning equipment amounted to $48 million or 22 per cent; and ice-making machinery, the remaining $5 million.

The 1948 value of shipments ($163 million) decreased 15 per cent from the $191 million in 1947, a reversal of the upward movement begun in 1945. The decrease in the value of shipments from 1947 to 1948 is due primarily to the decrease in the value of condensing units and is reflected in each type of condensing unit for which data were collected.

The value of all types of heat exchanger equipment shipped by establishments reporting in the 1948 survey decreased 6 per cent, from $50 million in 1947 to $47 million in 1948. This decrease was reflected in all major types of heat exchanger equipment for which separate data are collected, except for air conditioning unit coolers.

Shipments of self-contained air conditioning units continued to increase in 1948 as compared with previous years. Room type air conditioning units increased 56 per cent from $9.9 million in 1947 to $15.5 million in 1948; however, other than room type units increased only 9 per cent from $29.6 million to $32.3 million.

Factory shipments for export of components and accessories for air conditioning and commercial refrigeration equipment amounted to $12.5 million, or 8 per cent of the total shipments of these products. Exports of complete air conditioning units amounted to $2.2 million or 5 per cent of the total and exports of ice-making machines amounted to $0.3 million or again 5 per cent of the total. The export statistics included in this release represent data reported at the manufacturers' level, based on their knowledge of the ultimate destination of their products and may, therefore, differ from actual exports.

The shipments statistics included in this report apply to equipment actually billed and shipped. These figures are equivalent to completed sales. Complete units delivered on consignment or shipped to a branch warehouse for stock are not included until such time as they are actually sold. The dollar values shown are the manufacturers' net billing prices, f.o.b. factory.

The data for some types of air conditioning and refrigeration equipment have been combined in the tables of this report in order to avoid disclosing figures for individual companies.

This release for 1948 incorporates summary statistics for

TABLE I.—TOTAL SHIPMENTS OF AIR CONDITIONING EQUIPMENT AND COMPONENTS AND ACCESSORIES FOR AIR CONDITIONING AND COMMERCIAL REFRIGERATION EQUIPMENT, BY MAJOR CLASS OF PRODUCT: 1940-1948

(Money figures in thousands of dollars)

Product	1948		1947[1]		1946		1945		1944		1940	
	Number	Value	Number	Value	Number	Value	Number	Value	Number	Value	Number	Value
SECTION I—COMPONENTS AND ACCESSORIES												
TOTAL		$163,099		$191,146		$117,800		$ 71,896		$ 47,847		$ 45,405
Condensing units	818,862	71,993	1,039,772	98,296	755,538	55,379	354,401	36,902	189,578	21,872	211,021	18,808
Ammonia refrigerants	1,129	1,799	1,646	2,107	1,409	1,464	1,785	2,503	1,431	2,481	985	964
Refrigerants except ammonia	817,733	70,194	973,093	90,224	754,129	53,915	352,616	34,399	188,147	19,391	210,036	17,844
Air cooled	774,351	55,379	924,553	73,742	712,781	40,340	327,031	23,378	177,717	15,282	187,468	12,313
Water cooled	43,382	14,815	48,540	16,482	41,348	13,575	25,585	11,021	10,430	4,109	22,568	5,531
Condensing units, not reported by type			65,033	5,965								
Compressors and compressor units	459,390	33,493	n.a.	34,586	191,770	15,377	107,340	9,578	78,925	6,633	84,889	7,084
Ammonia refrigerants	4,156	9,209	4,415	9,481	3,176	5,862	3,211	5,059	2,259	3,322	1,734	2,234
Refrigerants except ammonia	455,234	24,284	313,682	20,148	188,594	9,515	104,129	4,519	76,666	3,311	83,155	4,850
Compressors and compressor units, not reported by type			n.a.	4,957								
Centrifugal refrigeration machines	361	10,351	563	7,889	312	6,593	185	2,994	70	1,736	112	2,403
Heat exchanger equipment		47,262		[2]50,375		40,451		22,422		17,606		17,110
Evaporative condensers	5,521	7,455	5,997	7,106	4,859	4,957	2,885	2,829	1,626	1,691	2,413	1,769
Unit coolers	102,223	17,524	141,163	19,611	190,552	18,203	91,003	10,186	58,921	6,631	63,417	7,076
Air conditioning	21,031	7,926	16,025	5,859	9,551	3,880	2,850	1,485	1,523	643	5,955	2,269
Refrigeration	81,192	9,598	125,138	13,752	181,001	14,323	88,153	8,701	57,398	5,988	57,462	4,807
Other heat exchanger equipment[3]		22,283		23,658		17,291		9,407		9,284		8,265
SECTION II—SELF-CONTAINED AIR CONDITIONING UNITS AND ICE-MAKING MACHINES												
Self-contained air conditioning units	110,579	47,808	74,976	39,509	47,664	19,500	14,973	11,230	n.a.	n.a.	n.a.	n.a.
Room type	73,638	15,503	42,904	9,930	29,835	5,870	1,126	326	n.a.	n.a.	n.a.	n.a.
Other than room type	36,941	32,305	32,072	29,579	17,829	13,630	13,847	10,904	4,468	3,615	5,880	4,467
Ice-making machines	8,332	5,341	7,822	3,122	n.a.	n.a.	2,805	4,044	3,665	3,351	1,045	628

n.a. Not available.

[1] Revised. Detailed statistics for 1947, as revised, are available in the 1947 Census of Manufactures publications.

[2] The 1947 data for heat exchanger equipment shown in this release have not been revised on the basis of additional reports received in the 1947 Census of Manufactures, since the data for these establishments have not been included for 1948. The total value as reported in the 1947 Census of Manufactures is $63,025 thousand. The 1949 release will include revised data for 1947 and 1948, including these additional establishments.

[3] Includes condensers and liquid coolers, shell and tube and shell and coil types, as well as fin coils (heating and cooling) and plate type evaporators.

TABLE II.—DOMESTIC[1] SHIPMENTS OF AIR CONDITIONING EQUIPMENT AND COMPONENTS AND ACCESSORIES FOR AIR CONDITIONING AND COMMERCIAL REFRIGERATION EQUIPMENT, BY MAJOR CLASS OF PRODUCT: 1940-1948

(Money figures in thousands of dollars)

Product	1948		1947[2]		1946		1945		1944		1940	
	Number	Value	Number	Value	Number	Value	Number	Value	Number	Value	Number	Value
SECTION I—COMPONENTS AND ACCESSORIES												
TOTAL	.....	$150,596	.....	$175,488	.....	$111,663	.....	$ 67,885	.....	$ 45,844	.....	$ 42,482
Condensing units	774,417	65,922	973,998	90,145	725,119	51,973	338,157	34,449	182,348	21,081	197,564	17,423
Ammonia refrigerants	939	1,535	1,426	1,862	1,281	1,324	1,642	2,334	1,352	2,380	902	893
Refrigerants except ammonia	773,478	64,387	907,539	82,318	723,838	50,649	336,515	32,115	180,996	18,701	196,662	16,530
Air cooled	732,911	50,675	862,645	67,500	685,088	37,864	313,058	22,211	171,217	14,753	175,153	11,323
Water cooled	40,567	13,712	44,894	14,818	38,750	12,785	23,457	9,904	9,779	3,948	21,509	5,207
Condensing units, not reported by type	.....	.....	65,033	5,965	.....	.....	.....	.....	.....	.....	.....	.....
Compressors and compressor units	449,053	30,442	n.a.	30,962	178,273	14,281	104,051	8,852	76,225	6,192	63,096	6,344
Ammonia refrigerants	3,285	7,318	3,636	7,664	2,766	5,230	2,900	4,487	2,062	3,034	1,525	1,967
Refrigerants except ammonia	445,768	23,124	271,465	18,341	175,507	9,051	101,151	4,365	74,163	3,158	61,571	4,377
Compressors and compressor units, not reported by type	.....	.....	n.a.	4,957	.....	.....	.....	.....	.....	.....	.....	.....
Centrifugal refrigeration machines	338	9,732	512	7,014	295	6,319	181	2,932	70	1,736	101	2,237
Heat exchanger equipment	.....	44,500	.....	[3]47,367	.....	39,090	.....	21,652	.....	16,835	.....	16,478
Evaporative condensers	5,086	6,752	5,555	6,650	4,536	4,639	2,664	2,609	1,486	1,576	2,212	1,666
Unit coolers	95,418	16,419	129,560	18,134	186,966	17,633	88,153	9,870	56,802	6,407	60,826	6,721
Air conditioning	20,099	7,552	14,989	5,533	9,341	3,773	2,773	1,448	1,473	624	5,624	2,181
Refrigeration	75,319	8,867	114,571	12,601	117,625	13,860	85,380	8,422	55,329	5,783	55,202	4,540
Other heat exchanger equipment[4]	.....	21,329	.....	22,583	.....	16,818	.....	9,173	.....	8,852	.....	8,091
SELF-CONTAINED AIR CONDITIONING UNITS AND ICE-MAKING MACHINES												
Self-contained air conditioning units	106,787	45,571	68,304	36,212	44,301	18,432	12,524	8,972	n.a.	n.a.	n.a.	n.a.
Room type	70,983	14,407	37,781	8,101	27,052	5,216	646	176	n.a.	n.a.	n.a.	n.a.
Other than room type	35,804	31,164	30,523	28,111	17,249	13,216	11,878	8,796	n.a.	n.a.	n.a.	n.a.
Ice-making machines	7,897	5,049	7,132	2,326	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

n.a. Not available.
[1] Continental United States.
[2] Revised. The data for 1947 include some export shipments, which were not called for separately in the 1947 Census of Manufactures.
[3] The 1947 data for heat exchanger equipment shown in this release have not been revised on the basis of additional reports received in the 1947 Census of Manufactures, since the data for these establishments have not been included for 1948. The total value as reported in the 1947 Census of Manufactures is $63,025 thousand. The 1949 release will include revised data for 1947 and 1948 including these additional establishments.
[4] Includes condensers and liquid coolers, shell and tube and shell and coil types as well as fin coils (heating and cooling) and plate type evaporators.

earlier years. Beginning with the statistics for 1948, the survey is being collected on an annual basis rather than on a quarterly basis as in 1946 and 1947. The reduction in periodicity was necessitated by reduced appropriations to the Bureau of the Census for collection of current statistics.

Data for 1947 and 1948 include statistics for commercial compressors and condensing units only. Data for earlier years include in the small size classification some household units which were reported to the Bureau as commercial refrigeration units. As a result, data for years prior to 1947 are not strictly comparable for these items.

The 1947 data, except for heat exchanger equipment, were revised on the basis of information received in the 1947 Census of Manufacturers. Although the original 1947 figures of $50.3 million for heat exchanger equipment were revised to $63.0 million in the 1947 Census of Manufactures, the unrevised data are shown in this release because the companies accounting for the increase were not included in the 1948 survey. The publication of the revised 1947 data would have resulted in too great a degree of noncomparability between the 1947 and 1948 figures for heat exchanger equipment. The 1949 release in this series will contain revised heat exchanger data for 1947 and 1948, including these additional establishments. The revised heat exchanger figures in detail as well as the detail for the other air conditioning and commercial refrigeration items can be obtained from the 1947 Census of Manufactures publication, "Service-Industry and Household Machines," which will be published and offered for sale by the Superintendent of Documents in the near future. Statistics for 1948 are based on reports submitted to the Bureau of the Census on Form M52A. Seventy-one plants were active in this industry during 1948.

Any inquiries concerning these data should be addressed to the Bureau of the Census, Industry Division, Metals and Metal Products Section, Washington 25, D. C.

Industry Standards for Blower Coils

THE Joint Coil Committee, representing the Refrigeration Equipment Manufacturers Association and the Air Conditioning and Refrigerating Machinery Association, Inc., reports it is making definite progress in the development of recommended industry standards for blower coils. The Committee's primary objectives are:

(a) To develop industry standards for forced-circulation, free-delivery air coolers for commercial refrigeration, covering recommendations on methods of testing and rating, minimum standard equipment, safety requirements, and minimum published data; also, application standards pertaining to such air coolers.

(b) To develop similar industry standards for natural-convection air coolers for refrigeration including both equipment standards and application standards.

The problems facing the Committee are substantial, but the progress made to date indicates that the objectives will be accomplished.

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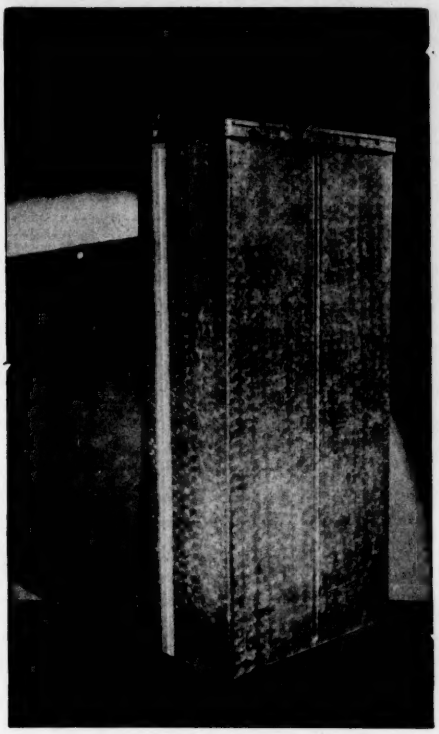
ICE CANS WELDED OR RIVETED
LARGE OR SMALL



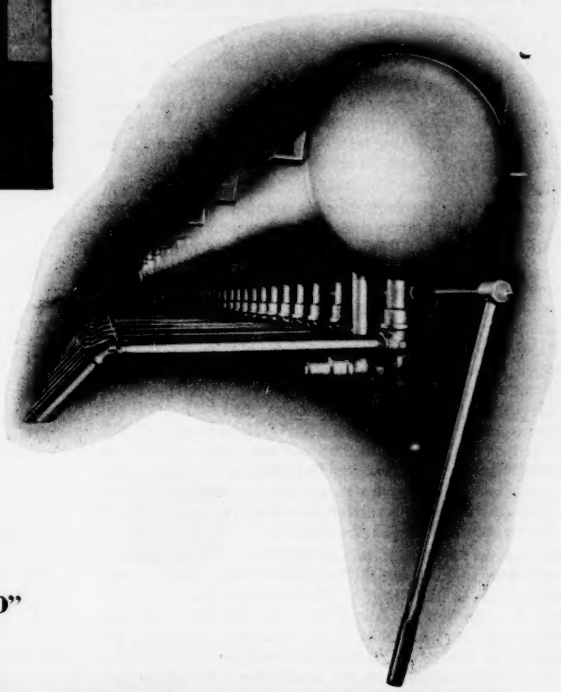
FOR: LOW PRESSURE
HIGH PRESSURE
ARCTIC POWNALL PLANTS

ALSO

CORE FILLERS
CORE SUCKERS
BRINE TESTING KITS
FISH FREEZING PANS
FISH FREEZER TRUCKS

ASK FOR
PRICE & DELIVERY

"BUILT STRONGER TO LAST LONGER"



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BUILT TO FILL ONE OR MORE CANS

ASSURES CLEAN WATER

MAY BE INSULATED

EASY TO INSTALL

SAME AMOUNT OF WATER AT EACH FILLING

YOU CAN GET YOURS—NOW!

CABLE ADDRESS: "KNICKSTACO"

KNICKERBOCKER STAMPING COMPANY
PARKERSBURG, W. VA.

A. S. R. E. Holds Annual Spring Meeting on Boat Cruise

DEPARTING from the usual custom, the 36th annual spring meeting of the American Society of Refrigerating Engineers was held aboard the S. S. Richelieu on a cruise from Montreal, Canada, up the Saguenay River. The trip started Sunday, June 5 and ended Thursday, June 9. A total of about 350 people made up the party including members and guests and their families. The Ontario Section A.S.R.E. acted as hosts.

Technical papers were presented during morning, afternoon and evening sessions and, in addition, the Arvida works of the Aluminum Co. of Canada and the large hydro electric plant at Shipshaw were visited. The American guests were greatly interested in visiting such typically French Canadian places as Tadoussac, Bagotville, Chicoutimi, Jonquieres and Quebec City. At Quebec City they spent one entire day shopping and sightseeing. For the ladies, entertainment on board was provided during the technical sessions and an entertaining program was provided for all during the evenings. Wednesday evening, the Ontario Section was hosts at a cocktail party and dance.

Technical Papers

A paper on "A Study of the Efficiency of Certain Desiccants in the Removal of Water from Refrigerating Systems" by B. J. Sterk, Socony-Vacuum Laboratories, Brooklyn, N. Y., was presented by J. F. Butterworth. In the discussion of this paper, it was brought out that the tests had been carried out with a limited number of desiccants. Herman Spoehrer pointed out that in many of the tests activated alumina had not been included with sova bead and silica gel. He questioned the ability of testers to rate the drying properties to as fine limitations as had been done in the paper. He also questioned the advisability of a suggestion made in the paper that drying agents might eliminate the use of drying ovens in some instances. It was suggested that the tests which were carried out at equilibrium should also have been run under velocity conditions.

Refrigeration Abstracts was presented at an evening technical session and created some discussion. The publication of the A.S.R.E. quarterly review was defended by D. K. Tressler, chairman of the A.S.R.E. publications committee. Dr. Tressler pointed out that much technical information is scattered throughout various publications which no one person would have time to read. Refrigeration Abstracts, he said, provided valuable service to those engaged in refrigeration research since they bring all the important current literature on the subject of refrigeration. He strongly urged the continuance of the publication including the Index. Past-president, C. Holske, said he felt the need of the publication had not been proved and said he had found no top refrigerating engineers whose company had used it during the past year. He pointed out that the poor financial status of Refrigeration Abstracts made it a considerable problem at the present.

A report on "Determination of Water and Non-condensable Gas Content of Freon-12 by a Dew Point Method" was presented by H. M. Elsey of Westinghouse Electric Corp. Research Laboratories. Dr. Elsey said this was a method he had found very efficient in his laboratory research. In discussion of this paper, George Iwashita pointed out that the dew point method was not applicable for commercial refrigeration units of larger sizes. He said another method is being developed that would give even better results and a paper on this problem probably will be presented at a later session.

An informal panel-type discussion was held on domestic refrigeration engineering, designed as a field survey on consumer reaction and usage under the direction of O. E. Norberg. R. F. Roider of the General Electric Co., Erie, Pa., led the discussion with description of results of an extensive field survey in the Southern States.

Among other papers presented were:

"Specific Heat of Foodstuffs," by Horace E. Staph, Bureau of Engineering Research, University of Texas, Austin, Tex.

"Moisture in Walls of Cold Storage Rooms" by Dr. Carl Munters, Stocksund, Sweden.

"Air Cycle Refrigeration and Its Applications" by Paul C. Scofield, AiResearch Manufacturing Co., Los Angeles, Calif.

"Theory and Use of the Capillary Tube Expansion Device, Non-Adiabatic Flow" by Prof. M. M. Bolstad, Mechanical Engineering Department, University of Missouri, Columbia, Mo., and Prof. C. R. Jordan, Mechanical Engineering Department, University of Minnesota, Minneapolis, Minn.

"New Development in Absorption Refrigeration" by Dr. A. A. Berestneff, Carrier Corp., Syracuse, N. Y.

"Cold Rubber—Its Preparation, Properties and Application" by Douglas Chalmer, Gates Rubber Co., Denver, Colo., presented by A. J. Hess.

Fiske to Survey Refrigeration in Mediterranean Area

DAVID L. FISKE, consulting engineer, 111 Broadway, New York, N. Y., has been engaged by the Economic Cooperation Administration for a three months' survey of refrigeration in the Mediterranean area, where a number of freezing, storage and food processing plants are projected. He will leave about July 10.

David L. Fiske

Mr. Fiske, former Secretary of the ASRE, has specialized in low temperature refrigeration plant design, on which he presented a paper to the spring meeting of the American Society of Mechanical Engineers, jointly with Walter Jones of the Carrier Corp. He was recently appointed ASME representative on the ASA Safety Code Committee, B9.

S & S Sturdy-Built *Refrigerated* Ice Vending Stations

BOOST ICE PROFITS AUTOMATICALLY!

Completely assembled, wired, and ready to operate on arrival at your location, S & S Sturdy-Built Ice Vending Stations are the time-tested keys to profitable ice merchandising. These silent salesmen work for you twenty-four hours a day making cash sales automatically . . . and capturing that profitable "after hour" business you normally lose.

During the three months period ending June of last year one Kansas station operator reported the following sales from one S & S Sturdy-Built Station: 1,758 — 12½ lb. bags of cubes, 1,650 — 25 lb. blocks, and 1,792 — 50 lb. blocks. One Oklahoma operator averaged gross sales of $50 a day during July of last year from block ice sales alone. These are but two of countless enthusiastic reports received from S & S Sturdy-Built Ice Vending Station operators throughout the nation.

DON'T LET THE SALES GO BY

Slash *your* distribution costs . . . step up *your* volume, and boost *your* profit margin with S & S Sturdy-Built Ice Vending Stations . . . for 17 years the ice industry's dependable automatic ice merchandiser.

Write for details, specifications and new low prices.

S&S ICE VENDING MACHINES

REFRIGERATED STURDY-BUILT ICE VENDING STATIONS

S & S VENDING MACHINE CO.
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San Jose, California

F. B. DICKINSON & CO.
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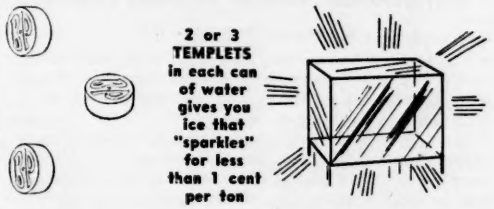
Summer production demands *FASTER FREEZING* in your plant...

B-P TEMPLETS permit you to safely lower the temperature of the brine and produce more ice per can when you need this extra capacity. TEMPLETS reduce the tendency that ice has to crack at these lower freezing temperatures . . . improve temper . . . reduce shattering and bad breaks.

B-P TEMPLETS aid in eliminating the cloudy veil, white butts and heavy cores which impair clarity of sized ice, cubes or blocks. Customers are pleased with ice that is crystal clear. TEMPLETS give your ice that *eye appeal.*

The B-P Templet treatment costs approximately...
1¢ PER TON



If you have experienced objectionable conditions in your plant, you need the B-P Templet treatment.

Surprising results are reported by many ice plant operators. Use B-P Templets in your plant this season and get full tonnage of clear ice from fast freezing. Get the complete story. No obligation. The coupon is for your convenience.

TEMPLETS are being used in Ice Plants throughout the United States and in many Foreign Countries.

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I&R 8-49

Fire Sweeps Utah Plant

(Continued from page 23)

Heaviest loss was in merchandise owned by the Utah Poultry & Farmers Cooperative. Charles P. Rudd, manager of the cooperative's poultry division said the loss in dressed chickens and turkeys would amount to more than half a million dollars. Some 20,000 cases of eggs valued at $360,000 were stored by Draper Poultrymen, Inc. of Draper, which was understood to have been sold Monday to a New York consignment firm. A total of about 84,000 pounds of candy valued at about $46,000 was owned by the Sweet Candy Company and by the Mrs. J. G. McDonald Chocolate Company. None of the merchandise was believed to be salvageable.

Mr. Hecker said there were five men, including himself in the building when the fire broke out. One of the men opened the door to the candy storage room and was engulfed by a huge burst of smoke. He slammed the door and informed Mr. Hecker who turned in a fire alarm.

Faulty Wiring Believed Cause

Later reports, following a two-day investigation by the fire chief and city electrical inspector indicated that the fire was caused by faulty electrical wiring. The investigation revealed that the fire apparently started when wiring leading from a fire box to a ventilating motor "shorted," igniting a partition in the building.

Refrigeration Without Running Expense

(Continued from page 28)

plates, about 1 foot square, furnishing more than enough rigidity. No nails, screws, bolts, or other fasteners are used. At no point is the roofing pierced, and any part of the installation may be lifted if desired.

As to the running expense of these roof coolers, this instance is even more remarkable because, within limits, there is none. The cooling tower, like any other, has to be bled in order to keep down the concentration of minerals in the water. This bleeding is done here through the roof coolers, and another waste, water ordinarily lost, is put to work.

References

(1) Refrigerating Engineering, March '40, page 242.

(2) Heating & Ventilating, July '38, pages 33-36; Architectural Forum, June '46, pages 165-169.

(3) Southern Air Conditioning & Refrigeration Journal, April '49, pages 11-19.

(4) Ibid., May '49, pages 15-22.

Book Review

BRITISH REFRIGERATION DIRECTORY AND HANDBOOK. Published by Modern Refrigeration, London, England. 310 pages. Illustrated.

The 1949 Edition of The Handbook of British Refrigeration Material and Home and Overseas Buyers' Guide reflects the rapid expansion of the industry in England. The publishers state that the present issue is timely for the export market that British refrigeration machinery and apparatus are developing. The 310 pages of this quarto volume contain not only a directory of all sections of the British refrigeration industry but a reference guide to its technical and trade organizations, as well as a serviceable collection of tables and data for engineers and others.

New Method of Freezing Eggs in the Shell

(Continued from page 20)

during the storage at about 32 F. This loss would be still less if the humidity of the room were kept higher. Eggs kept in an undercooled condition at 23 F for 7 months lost 1.8-2.9 per cent (10), and if the theoretical formula developed by Greenlee (2) is valid, the calculated loss at storage temperatures below 28 F is zero.

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1. Brooks, T., and Pace, T. "The Equilibrium Between Carbon Dioxide and the Egg," Food Invest. Board, 1938 37-38.

2. Greenlee, A. D., Amer. Chem. Soc. 1912, 25, 539.

3. Heiss, R. "Recherches au sujet des besoins de froid et de pourcentage d'eau congelee au cours de la congelation rapide et de la congelation lente des denres alimenaires," Institut International du Froid, Paris Anex 193, 25-38.

4. Kaloyereas, Socrates A. "A New Method for Freezing Foods," Patent No. 8026-25 February, 1939, Athens, Greece.

5. Kaloyereas, Socrates A. Food Res. 1947, 12, 419.

6. Kaloyereas, Socrates A. Fruit Prod. J. 1947, 27, 6.

7. Moran, T. Z. Ges. Kalte Ind., February, 1938, Heft 2.

8. Rolet, A. Les Conserves, 1920, 2, 169-219.

9. Tressler and Evers, Freezing Preservation of Foods, 1949 p. 636.

10. Tuchsneid, M. W. Die Kaltetechnologische Vreabeitung Schnellverderblicher Lebensmittel, 1936 p. 357.

Supplement Establishes New Ratings Pipe Flanges and Flanged Fittings

A SUPPLEMENT No. 1 to American Standard Steel Pipe Flanges and Flanged Fittings (ASA B16e6-1949) has been issued by The American Society of Mechanical Engineers. It was developed by The Sectional Committee on Standardization of Pipe Flanges and Fittings and has been approved by the American Standards Association. Due to the existence of two sets of ratings, considerable confusion has been created in industry and this supplement will replace all existing American Standard rating tables.

Fires and Accidents

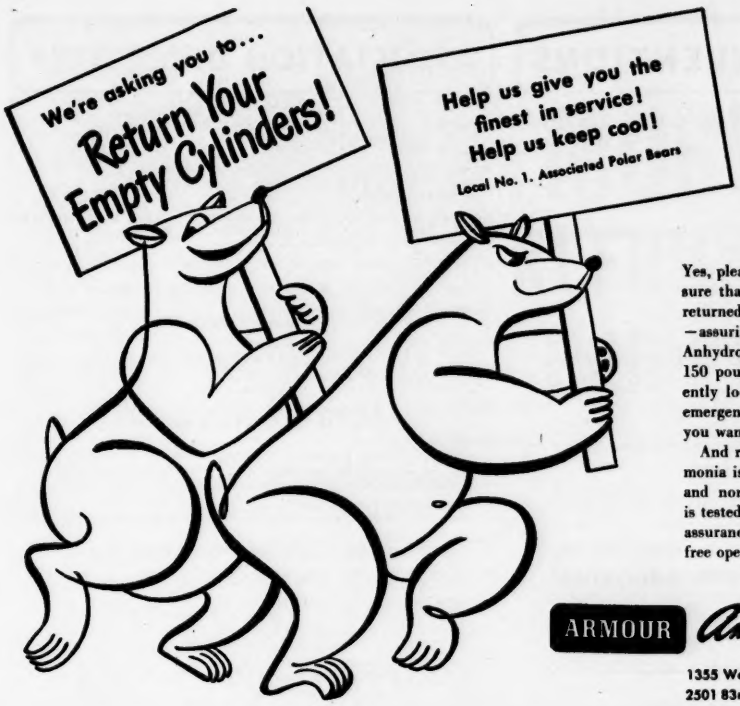
Little Rock, Ark.—An exploding 50-gallon gasoline drum resulted in a damaging fire recently to the Standard Ice Co. here. An employee of the firm stated that he was swabbing up the floor in the vicinity of the fuel drums when one of them suddenly exploded sending flames shooting up the wall to the roof.

Oak Grove, La.—The Oak Grove Ice Plant, owned by the Fudickar interests in Monroe, La., was destroyed by a fire which was touched off by lightning June 14.

Belvidere, Nebr.—The Belvidere Locker Plant suffered damage estimated at over $10,000 when a tornado recently hit this town, killing three persons and wrecking several buildings in the downtown section.

Dallas, Tex.—The Superior Ice Co. plant here was damaged to the extent of $50,000 when a belt broke on an engine governor which allowed the engine to overspeed. Portions of the engine flywheel hit the flywheel of a compressor and also ruptured some ammonia lines.

Salt Lake City, Utah—The Utah Ice & Cold Storage plant located at 341 South Fifth St. West, was swept by fire on Tuesday, June 28. Property loss was estimated at $1,306,000. The origin of the fire is thought to be defective wiring. The building attacked by the fire is a refrigerated storage building and contained 250,000 pounds of eggs, 500,000 pounds of frozen poultry and 500,000 pounds of candy. Twenty firemen were overcome by the dense smoke which eddied throughout and around the building.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Return Your Empty Cylinders!
Help us give you the finest in service! Help us keep cool!
Local No. 1. Associated Polar Bears

Yes, please look around your plant and make sure that every ammonia cylinder has been returned. Armour will continue to do its part —assuring you prompt shipment of Armour's Anhydrous Ammonia in either 50, 100 or 150 pound cylinders. Armour's 65 conveniently located stock points can deliver your emergency order where you want it, when you want it and fast.

And remember, Armour's Anhydrous Ammonia is pure and dry . . . free of moisture and non-condensable gases. Every cylinder is tested before shipping to give you positive assurance of fine quality and to insure trouble-free operations.

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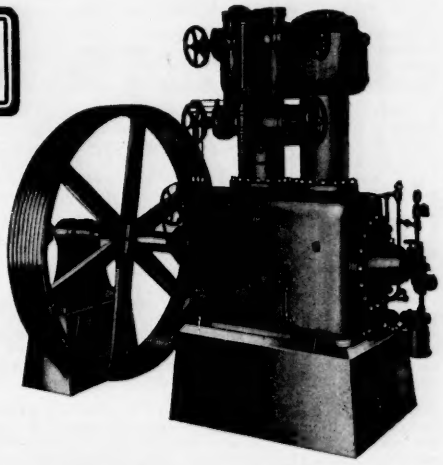
Sterling DEPENDABLE REFRIGERATION



The phrase "STERLING DEPENDABLE REFRIGERATION" is more than a slogan—it's a fact.

Built with rugged strength for endurance, with advanced design for efficiency and economy of operation, STERLING Ammonia Compressors are the product of more than fifty years of "know how" in the manufacturing of refrigeration machinery and equipment.

A complete range of sizes insures the correct compressor for each application.

Deliveries are, at present, current—most models of compressors are available from stock.

For complete information, see your nearest STERLING distributor, or write the factory.

REYNOLDS MANUFACTURING CO.

SPRINGFIELD *"Builders of Fine Refrigeration Equipment"* **MISSOURI**

COMING CONVENTIONS

NATIONAL FROZEN FOOD LOCKER ASSOCIATION

August 28-31, 1949
Stevens Hotel, Chicago, Ill.
S. A. WARRINGTON, Secretary

NATIONAL ASSOCIATION PRACTICAL REFRIGERATING ENGINEERS

November 8, 9, 10, 11, 1949
Purdue University, Lafayette, Ind.
EMERSON BRANDT, Secretary

NATIONAL ASSOCIATION OF ICE INDUSTRIES

November 15, 16, 17 and 18
Hotel Commodore, New York, N. Y.
MOUNT TAYLOR, Secretary

DELTA STATES ICE ASSOCIATION

November 28-30, 1949
Buena Vista Hotel, Biloxi, Miss.
R. N. MILLING, Secretary

MISSOURI ICE MANUFACTURERS ASSOCIATION

January 9, 10, 11, 1950
Hotel President, Kansas City, Mo.
V. A. ESPHORST, Secretary-Treasurer

Sales and Reorganizations

Bridgeport, Conn.—The Southern New England Ice & Oil Co., is now under new management and is being operated under the name of Park City Storage Co. Inc.

Savannah, Ga.—Sale of the Quality Ice Co. and a portion of Maccao Island for $40,000 was recorded recently. The seller was listed as Felice Ferlise of Birmingham, Ala., and the purchaser as Pasquale Ferlise.

Chicago, Ill.—Libby, McNeill & Libby has sold its warehouse property at 4000 Packers Ave., to the Packers Terminal & Warehouse Corp., according to Nicolson, Porter & List, Inc., broker in the deal. The property contains 330,000 sq. ft. and will be operated as a cold storage and merchandise warehousing business.

Charleston, Mo.—The Missouri Utilities Co. has announced sale of its ice business and ice-making facilities to the Public Ice Service Co. of Cairo, Ill. The new company will retain J. M. Williams as the Charleston dealer.

Sidney, Nebr.—Mrs. Herbert Byrd has announced the purchase of her sister's interest in The Western Ice and Storage Co. Mrs. Byrd said the transaction now makes her sole owner of the business. Her husband is manager of the concern. Many service expansion plans are being considered and will be installed as conditions permit.

Quinlan, Tex.—The Holden Ice Co. here was purchased recently by Johnnie Phillips, veteran of several years in the ice business. The company was owned by Henry Holden who together with Mrs. Holden operated the local ice house for three years. Phillips expects to establish more ice routes emanating from Quinlan.

Lockport, N. Y.—The Lock City Cold Storage, Inc., 97 Grant St., has been purchased by Arthur B. Gifford. Formerly the Lerch Cooperative Cold Storage, it was purchased in 1946, by a group of stockholders.

Ogden City, Utah—Lease of the plant facilities of the American Packing and Provision Co., 390 W. Twenty-Fourth, to Swift & Co. was announced recently by J. M. DeVine, president. Mr. DeVine, who has operated the plant for 10 years plans to continue in the Western Gateway storage business.

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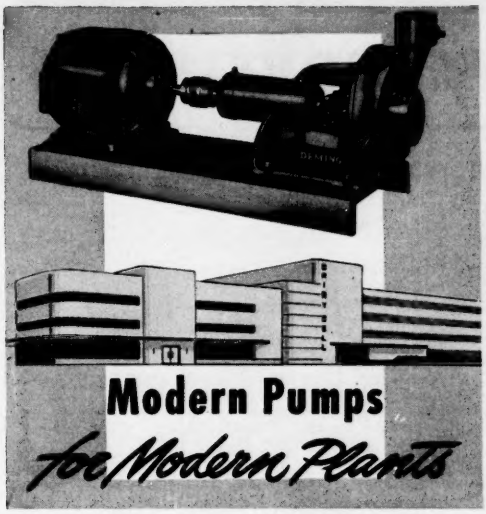
WISCONSIN ASSOCIATION OF ICE INDUSTRIES
Paul F. Hoff, Secretary, 1300 East Locust St., Milwaukee, Wis.

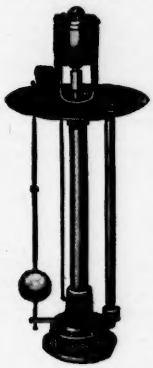
New Incorporations

Lake Charles, La.—Pure Ice Co. has filed articles of incorporation with the following incorporators: Wm. L. Parkin, president, John W. Smith, vice-president, and Mary E. M. Parkin, secretary-treasurer, Little Rock, Ark. Authorized capital stock was listed at $15,157.03. Principal business will be making and selling of ice.

Houston, Tex.—Charters have been issued to the R. E. Horlock Ice Co. of this city and of Texas, separate companies. The Houston company has a capital stock of $250,000, 2,500 shares of no-par value stock, as does the Texas companies. The incorporators for both companies are R. W. Horlock, R. E. Horlock and F. P. Horlock.



. . . and for modernizing the pumping equipment of old plants. Deming offers you a complete range of selection for type and capacity to meet every need.



For example, Deming Vertical Sump Pumps incorporate the latest developments to insure highest efficiency and dependability. The extensive line includes numerous sizes in capacities from 10 to 3200 gallons per minute with heads up to 120 feet and speeds from 860 to 1750 r. p. m. for motor drive. Write for BULLETIN 4605.

Deming Deep Well Turbine Pumps are used widely in your industry for dependable, low cost water supply. Complete information in BULLETIN 4700-8. Write to:

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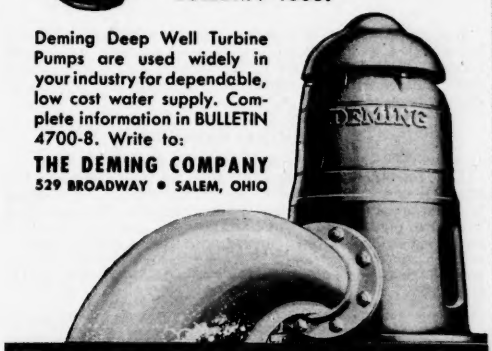


DEMING
THE COMPLETE LINE
PUMPS AND WATER SYSTEMS

MORE REFRIGERATION PER POUND

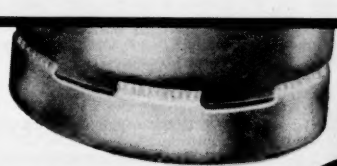
BARRETT Standard Anhydrous Ammonia has a higher refrigerating effect, per unit liquid volume, than any other type of refrigerant. This means *more* refrigeration per pound of refrigerant used.

Other advantages of using Anhydrous Ammonia are: low initial cost, low power consumption, low friction losses and low vapor density.

These characteristics, together with consistent purity, and uniform quality, have made Barrett Standard Anhydrous Ammonia the outstanding choice of refrigerating engineers since 1890.

Barrett Standard Anhydrous Ammonia —the reliable, dependable, all-purpose refrigerant—is available in 150, 100 and 50-pound cylinders for *speedy delivery* from stock points conveniently located from coast to coast.

Barrett STANDARD ANHYDROUS AMMONIA



THE BARRETT DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 Rector Street, New York 6, N. Y.
4328 South Broadway, St. Louis 11, Mo.

Barrett

NEW PLANTS AND IMPROVEMENTS

Information pertaining to proposed new plants utilizing refrigerating equipment, as well as additions, improvements, and rehabilitation of existing plants. News regarding such new plants and additions is invited for publication in this department.

CALIFORNIA

Dinuba, Calif.—Samuel C. Shong has begun construction on a new packing house and office building. The former building was destroyed by fire several months ago.

Fresno, Calif.—The George A. Francis Co. is now operating a recently delivered Sturdy-Built Ice Vending Station, Model 20. Delivery was made from the San Jose, Calif., plant of the S & S Vending Machine Co.

Fresno, Calif.—An addition to the cold storage plant of the Mid-State Horticultural Co. is being erected at East and California Aves., at a cost of $150,000. A new feature of the plant addition will be completely air conditioned loading platform, to protect the grapes against higher temperatures being moved from storage into refrigerated cars.

Reedley, Calif.—Jack G. Benigno, fruit and vegetable packer is building a new packing house located on the Santa Fe spur tracks just off Dinuba Ave., to be known as the O'Jack Packing Co. The new plant is being built of concrete blocks reinforced with concrete and steel and will be 100 ft. x 50 ft. The owner plans to erect a cold storage plant at the front of the property later.

Riverbank, Calif.—Ice dispensers have been installed at the Riverbank Frozen Food plant recently. The dispensers are located at the front of the plant on Santa Fe St. between First and Second St. and will operate 24 hours each day.

FLORIDA

Miami, Fla.—Master Freezers, Inc., is having constructed at 50 N. W. 19th St. a cold storage warehouse with 750,000 cu. ft. of storage space and a capacity of between 15 and 20 million pounds. It is estimated that cost of construction will be $836,000. It is expected the plant will be ready for occupancy in September.

GEORGIA

Brunswick, Ga.—The Glynn Ice & Coal Co. has opened a 24-hour automatic ice service station at 2108 Norwich St., E. H. Diemmer, general manager of the company, announced.

Metter, Ga.—J. Foster Williams, who operates the ice plant at Millen, has announced that he will soon complete the construction of a large ice storage and meat curing plant here.

INDIANA

Lafayette, Ind.—Continental Freezers, Inc., a wholly owned subsidiary of Lafayette Foods, Inc., is erecting a modern refrigerated warehouse of 8 to 10 million pounds capacity here. The new plant will engage in general cold storage business with particular emphasis on frozen foods and storage in transit. K. F. Stepleton is president and general manager.

Portland, Ind.—The Portland Ice & Coal Co. recently installed a new S & S Vending Machine.

IOWA

Centerville, Ia.—Pure Ice Company last month installed a new Sturdy-Built Ice Vending Station. The unit equipped with S & S Vending Machines was manufactured by the F. B. Dickinson Co. of Des Moines, Iowa.

KENTUCKY

Louisville, Ky.—Additional S & S ice vending machines have been placed in operation by the Jefferson Ice Co. of this city. The units will be used to dispense ice cubes.

MASSACHUSETTS

Quincy, Mass.—Granite City Ice Co. has installed additional Sturdy-Built Ice Vending Stations equipped with S & S ice vending machines.

MISSOURI

Kirksville, Mo.—The Ralph Eggert Service Co. last month installed a Sturdy-Built Ice Vending Station. Containing S & S ice vending machines, the unit was secured from F. B. Dickinson Co. of Des Moines, Iowa.

Louisiana, Mo.—The new ice plant of the Louisiana Ice and Cold Storage Co. has started operation. The new plant freezes 784-300 lb. blocks of ice as compared to the 500-300 lb. blocks in the old plant. The new concrete block building which was almost a year in construction is 32 ft. by 81 ft. H. L. Griesedieck is owner.

NEW JERSEY

Ocean City, N. J.—The American Ice Co. recently equipped the storeroom with S & S Ice Vending Machines and is now dispensing block ice as well as 10 pound packages of cubes, automatically, 24 hours a day.

NEW YORK

Albany, N. Y.—The Albany Port District Commission has received a suggestion that refrigeration be installed in some of the sheds at the Port of Albany to take care of storage of fruits and vegetables. The commission is studying the feasibility of such a project which might bring in additional revenue in the next few years.

NORTH CAROLINA

Asheville, N. C.—A House Public Lands Subcommittee approved a bill June 10 authorizing the Eastern Cherokee Indians of North Carolina to lease 1½ acres to the Farmers Federation Cooperative for a freezing plant site.

OHIO

Barberton, Ohio—A recent installation by Henry Coal & Ice Co. is a Sturdy-Built Ice Vending Station which now enables ice users of that city to purchase ice 24 hours every day. Equipment was supplied by F. B. Dickinson Co. of Des Moines, Iowa.

PENNSYLVANIA

Erie, Pa.—A new refrigerated food storage warehouse has been opened here by the S. M. Flickinger Co., of Buffalo, N. Y., sponsors of the Red & White Food Store organization. The new plant which will handle fresh and frosted fruits and vegetables, butter, cheese and dairy products, will accommodate ten carloads of fresh produce, ten carloads of frosted foods and can ripen two carloads of bananas simultaneously.

TEXAS

Amarillo, Tex.—Hugh Drane Ice Factories, Inc., have installed two additional Sturdy-Built Ice Vending Stations, operated by the Palo Duro Ice Co.

El Paso, Tex.—Consumers Ice Co. was issued a $7000 city building permit recently for repair and remodeling of their ice plant at 1621 Texas St.

Always PURE

...and Guaranteed Minimum 99.98% Anhydrous Ammonia

Count on three big advantages when you use Du Pont "National" Ammonia: 1) Purity, 2) Uniformity, 3) Dependability. This means peak performance—all year round. Prompt delivery too . . . from distributing points all over the country. E. I. du Pont de Nemours & Co. (Inc.), Ammonia Department, Wilmington 98, Del.

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DU PONT

BETTER THINGS FOR BETTER LIVING ...THROUGH CHEMISTRY

NATIONAL

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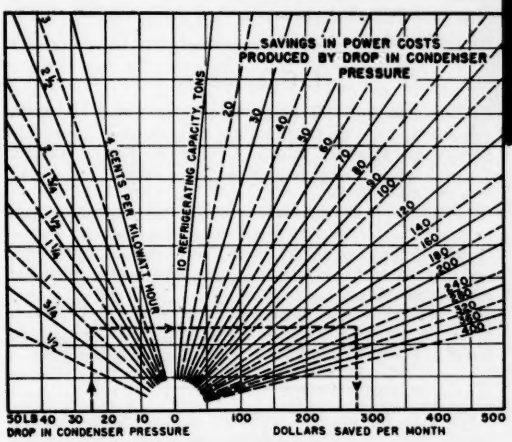
AMMONIA

A Simple Way to Reduce REFRIGERATION COSTS and Increase Capacity


SAVINGS IN POWER COSTS PRODUCED BY DROP IN CONDENSER PRESSURE
10 REFRIGERATING CAPACITY TONS
4 CENTS PER KILOWATT HOUR
DROP IN CONDENSER PRESSURE
DOLLARS SAVED PER MONTH
50 LBS 40 30 20 10 0
100 200 300 400 500

This Chart Tells the Story*

FOR EXAMPLE: If you have a 220 ton refrigerating system, a power cost of 1¢ per kilowatt and your condenser pressure is 25 lbs. above normal (a very common condition) non-condensable gases are costing you approximately $275 per month — money that is totally wasted. An Armstrong Purger will eliminate this loss.

**Chart prepared by R. C. Doremus, Detroit Ice Machine Co.*

AIR and other non-condensable gases in a refrigerating system raise head pressure, make the compressor work harder and longer, reduce condenser capacity and thereby raise power costs. Ordinary purging methods seldom, if ever, get rid of all the air; they waste refrigerant and they take a lot of valuable time.

The answer is to install an ARMSTRONG PURGER. It gets all the air out of the system *with minimum refrigerant waste.* Hundreds of users state that their Armstrong Purgers have paid for themselves in from 30 days to six months. The forged steel body and stainless steel mechanism provide safety and dependability. The price is modest. The Purger is *unconditionally guaranteed* to give satisfaction.

SEND FOR BULLETIN

HOW TO TELL when non-condensables are present; their effect on efficiency and economy; how the Armstrong Purger operates; prices and data are contained in the Armstrong Purger Bulletin. Send for your copy.

ARMSTRONG MACHINE WORKS

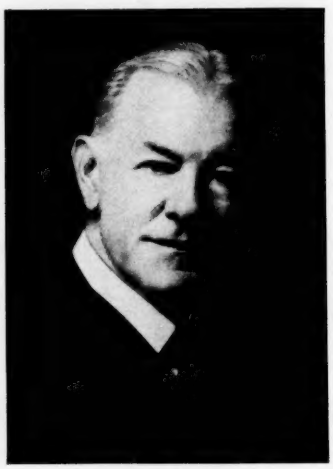
860 Maple St., Three Rivers, Mich.

ARMSTRONG Non-Condensable Gas PURGER

OBITUARY

William K. Martin

MEMBERS of the ice industry were grieved and shocked to learn of the sudden death on Sunday, July 10 of William K. (Uncle Billy) Martin, president of the Crawfordsville Ice & Cold Storage Co., and president of the Citizens National Bank of Crawfordsville, Ind. Death occurred at his home from coronary occlusion. He was 81 years old and had had excellent health all his life and had been at his office at the bank regularly up to the day before his death.



Wm. K. Martin

Mr. Martin was a charter member and for many years treasurer of the National Association of Ice Industries, succeeding Joseph Black as treasurer in 1928 and serving in that capacity since that time. He was also a charter member and former president of the Indiana Association of Ice Industries also an honorary life president and honorary life director of that association. He was proud of the fact that he had been present at every annual convention of the state association with possibly one exception when absence was enforced by a brief illness. He had a similar record at the annual conventions of the National Association.

He was a pioneer in the Indiana ice industry and was fond of reminiscing about the early ice days when ice was harvested from ponds and streams and stored in ice houses, and the customary method of delivery was to toss a chunk of ice in the front yard or leave it on the sidewalk in front of stores and restaurants.

Mr. Martin was probably the best known ice man in the country, meeting his many business associates and friends in the industry each year at the National and State conventions and serving on various committees of both associations. His geniality and sound business advice will be long remembered.

Active in the business and civic life of Crawfordsville for more than half a century and one of the city's most prominent business men, he had served as president of the Crawfordsville Heating Co., and the Home Telephone Co. He was a trustee of the Oakhill Cemetery Association. He was a member of Sigma Chi Fraternity, Crawfordsville Rotary Club, Crawfordsville Elks Club and Crawfordsville Country Club and the Indianapolis Columbian Club.

He was captain of Wabash College's first football team in 1886 and originated the Wabash College color, scarlet, which he suggested during a meeting. He was a graduate of Wabash College and was active in the affairs of the college after graduation. He was an ardent golfer, widely known in state golfing circles having been an active member of the Indiana Golf Association for many years.

He was born in Crawfordsville, the son of William and Elizabeth Martin, pioneer residents of that community. Surviving are his widow, Mrs. Julia P. Martin, a sister, Mrs. Ed. Reynolds and an uncle, Hal C. Martin, all of Crawfordsville.

Charles E. Nichols

THE death of Charles E. Nichols, Washington representative of the American Warehousemen's Association Merchandise Division, and long prominent in the warehousing industry occurred suddenly in Washington, D. C. July 3 after a brief illness. He was 64 years old.

Mr. Nichols began his career as a civil engineer with Stone & Webster Engineering Corp. of Boston, Mass., in 1910 after taking an engineering degree at Harvard University. He entered the warehousing business in 1930 as vice-president of the Merchants Warehouse Company, Boston, and served as its president from 1934-1937. He was with the TVA in Washington and Knoxville until 1943 when he took up duties as Warehouse Consultant and Washington representative of the AWA Merchandise Division. In addition, he served at various times as Secretary, Massachusetts Warehousemen's Association, member of the Executive Committee of the AWA Merchandise Division and New England Representative, Merchandise Warehousing Industry Code Authority.

He is survived by his widow, Mrs. Helen Nichols; three children, Charles Eliot Nichols Jr., John L. Nichols II, and Mrs. Ruth Nichols Jackson.

H. G. Ferguson

THE death of H. G. Ferguson, president of the Fairfield Ice & Coal Co., Fairfield, Ill., occurred from heart disease at the Missouri Athletic Club in St. Louis, June 20. Funeral services were held in that city June 22 and burial was in Louisville, Ky.

In addition to his interests in the Fairfield Ice & Coal Co., he was a majority stockholder in the newspaper, Wayne County Record and the Fairfield Creamery Co. at Fairfield, and had extensive holdings in farm and oil properties in Illinois and Missouri.

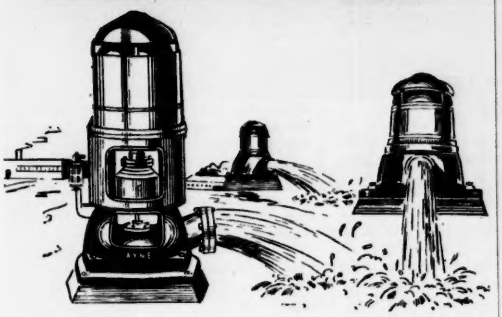
Mr. Ferguson was a bachelor and is survived by two sisters, Mrs. Lottie F. Sexton who lived with him in his home at Fairfield, and Mrs. F. P. McChesney of St. Louis.

FLOYD W. CROWE, vice president and general manager of the Northern Refrigerator Line, Inc., and the Merchants Dispatch Corp., died in an Evanston, Ill., hospital June 15 after a long illness. He was 58 years old. Mr. Crowe began with the Illinois Central Railroad in 1910 and from 1919 to 1923 was general superintendent of refrigeration for the New York Central Lines.

JOHN N. DAWN, chief engineer, Southern Ice Co. plant, Sherman, Tex., died of a heart attack June 13. He was 70 years old. Mr. Dawn had been chief engineer for the ice company for 23 years.

BIG OR LITTLE

They All Have the
Same Layne Quality



Layne has constantly maintained the highest quality of materials and finest precision manufacturing in all of their Well Water System installations. The smallest are just as substantial in construction and as high in efficiency of operation and always produce proportionately as much water as the biggest. This fact has been proven time and again to the complete satisfaction of hundreds of owners.

When Layne builds a Well Water System, more than fine casing, impellers, shafting, motors and skillful manufacturing are used. Layne's reputation extending back over nearly three quarters of a century as the world's most capable well water developers is included.

All Layne Well Water Systems are equipped with the famous high efficiency Layne Vertical Turbine Pumps. These pumps are designed and manufactured exclusively in Layne's own plant where every detail of their construction and assembling is under the supervision of engineers.

Write for catalogs and information about Layne's complete service which includes surveys, water strata explorations, pump installations, etc., for a complete Well Water System. Address LAYNE & BOWLER INC., General Offices, Memphis 8, Tenn.

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WELL WATER SYSTEMS

AFFILIATED COMPANIES: Layne-Arkansas Co., Stuttgart, Ark. • Layne-Atlantic Co., Norfolk, Va. • Layne-Central Co., Memphis, Tenn. • Layne-Northern Co., Mishawaka, Ind. • Layne-Louisiana Co., Lake Charles, La. • Louisiana Well Co., Monroe, La. • Layne-New York Co., New York City • Layne-Northwest Co., Milwaukee, Wis. • Layne-Ohio Co., Columbus, Ohio, • Layne-Pacific, Inc., Seattle, Washington, • Layne-Texas Co., Houston, Texas • Layne-Western Co., Kansas City, Mo. • Layne-Minnesota Co., Minneapolis, Minn. • International Water Corporation, Pittsburgh, Pa. • International Water Supply, Ltd., London, Ontario • Layne-Hispano Americana, S. A., Mexico, D. F.

NIAGARA AEROPASS CONDENSER (Patented)

Saves half the Engineer's Troubles ...with a Refrigeration Plant

Hundreds of engineers have been interviewed about their experience with the Niagara Aeropass Condenser. In one way or another, they say, "I wouldn't go back to anything else." And their managers, who watch the costs, say, "Best investment we ever made, couldn't operate now, without it."

Niagara Aeropass Condensers have three exclusive features which save trouble and money in running a refrigeration plant:

The "Duo-Pass"— keeps scale and salts from crusting the coils, keeps the condenser always at full capacity.

The "Oilout"— removes oil and dirt from the refrigerant, at the exact point where the oil vapor is condensed and the refrigerant is not.

The "Balanced-Wet-Bulb" control gives automatic operation at the minimum head pressure, saving power cost the year 'round!

In addition, the Niagara Aeropass Condenser saves nearly all your cost of cooling water, quickly bringing back to you the cost of installation. In plants where refrigeration is a production process, owners know that this condenser has reduced their costs.

Write for Bulletin 103.
You can see one of these installations near you.

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Over 35 Years of Service in Industrial Air Engineering

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INDUSTRIAL COOLING • HEATING • DRYING
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HUMIDIFYING • AIR ENGINEERING EQUIPMENT

NEW AND IMPROVED EQUIPMENT

MACHINERY-APPLIANCES-PROCESSES

Information contained in this department is furnished by the manufacturer of the article described and is not to be construed as the opinion of the Editor.

Relative Humidity Indicator Has Fan Attachment

ACCURATE humidity readings can now be obtained quickly in factories, shops, rooms and even small, confined spaces near, or in operating machinery, with a new motor-operated fan developed for attaching to any Weston Relative Humidity Indicator. The small fan, powered by dry cells, will move air over the indicator's wick in sufficient volume to permit obtaining stable readings within 30 seconds. This makes possible complete analysis of humidity conditions in, for example, a textile mill, particularly in and around the machinery while it is operating, thus enabling the adjustment of the humidifiers and air-conditioning equipment for best results. No calculations are required, as readings are immediately obtained on the instrument's simplified slide rule.

New Weston Relative Humidity Indicator with Fan Attachment.

Weston Relative Humidity Indicators are now available with or without the auxiliary fan, or the auxiliary fan can be purchased separately. Complete information may be obtained by writing to the Weston Electrical Instrument Corporation, 617 Frelinghuysen Avenue, Newark 5, N. J.

Machine Sizes Ice and Loads Bags

A NEW loader sizer for ice with which it is claimed one man can do the work of two or more, has been introduced by the Bateman Foundry and Machine Co., Inc., of Mineral Wells, Texas. It is designed with a magazine under the sizing unit that will hold ten 50 lb. blocks of ice which feed into the elevator one at a time. This takes the place of a man having to feed the crusher. While filling 100 lb. ice bags, the operator has time to keep the magazine full of ice as well as fill bags, thus making a one-man operation.

As each block of ice from magazine slides onto the elevator, an automatic revolving chain lifts up elevator, turning it over into crusher. Elevator is timed to take 175 lbs. a minute. When ice drops from crusher, it is thrown onto a slightly curved screen which is set at an angle to remove the snow. The larger pieces of ice travel down two sets of slides on their own momentum and fall through openings between the slides into separate bins, making four sizes of ice.

The slides are designed with a taper and have almost square corners on the edges. This is why the Bateman Sizer will work with the principle of ice being sized on slides. (Patent Pending.)

Each bin of the Loader Sizer has a sliding door which opens easily to allow ice to flow into bags. When bags are filled, operator can shut doors while replacing bags. Each bag is held in place by a bag holder so constructed that operator, to change bag, only has to lift the bag onto a half ring and clamps on each end hold bag in place.

New Bateman Loader Sizer in operation in plant of Southern Ice Co., Fort Worth, Texas.

Crusher has 12 large teeth on a 10 inch drum. Teeth are bolted to drum, and the lock washer and nut fit into a machined flat surface. Plates on side of crusher can be removed to install new teeth without removing side of crusher. Five adjustments on the grate give the operator better control of the size of ice before it falls onto the sizing slides, therefore he can fill one bin more than the others with the size of ice desired.

Drum turns 80 revolutions per minute, therefore, due to the slowness of the drum, teeth have a chance to cut rather than hammer ice, thus reducing snow.

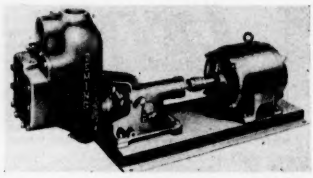
Either roller bearings or oilite bearings come with crusher. For high production, roller bearings are recommended. Gears are in an enclosed case. There is no rust, for all parts that come in contact with ice are either galvanized or plated.

The loader size is 8 ft. 8 in. high, 8 ft. long and 24 in. wide. Where vaults do not have proper height, a dog house can be made where elevator turns over ice into crusher. The sizer is bolted together so that it can be disassembled for installation, if necessary.

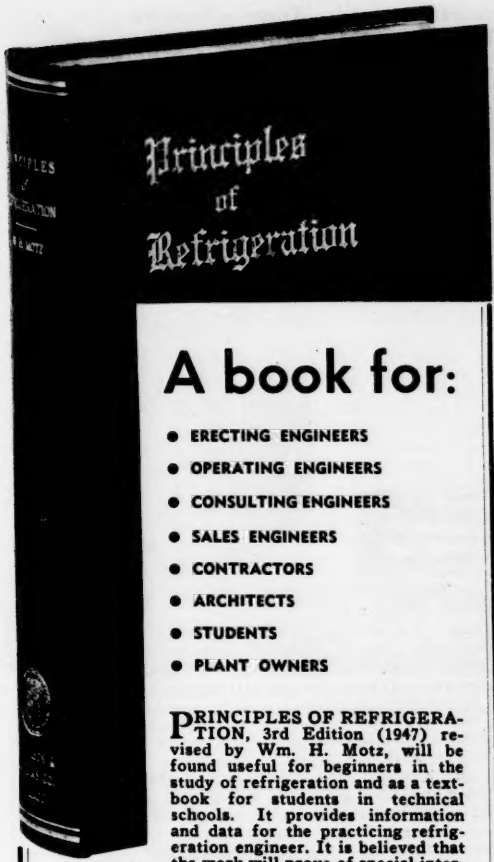
A smaller floor bin size is ideal for the small ice plant or ice station. This machine has a 50 lb. crusher and makes four sizes of ice. Height of this sizer is only 4 ft. 7 in. This machine can be easily disassembled for installation in any small vault.

Self-Priming Pumps

SIX stationary models of self-priming pumps announced by the Deming Co., Salem, Ohio, cover a range of capacities from 10 to 300 gallons per minute against heads up to 250 feet. Uses include general industrial pumping services, mine gathering service, irrigation or dewatering service and sump or bilge pumping. Priming is fast, automatic and reliable. A positive non-siphoning feature assures automatic repriming regardless of the amount of backwash or suction line surge encoun-



Stationary Model self-priming pump made by Deming Co., Salem, Ohio.



A book for:

- ERECTING ENGINEERS
- OPERATING ENGINEERS
- CONSULTING ENGINEERS
- SALES ENGINEERS
- CONTRACTORS
- ARCHITECTS
- STUDENTS
- PLANT OWNERS

PRINCIPLES OF REFRIGERATION, 3rd Edition (1947) revised by Wm. H. Motz, will be found useful for beginners in the study of refrigeration and as a textbook for students in technical schools. It provides information and data for the practicing refrigeration engineer. It is believed that the work will prove of special interest to erecting and operating refrigerating engineers, refrigeration machinery sales engineers, persons employed in building refrigerating machinery and those employed in ice making, cold storage plants or other establishments equipped with refrigerating machinery. In general the work contains information that is necessary the refrigerating engineer should know in order that he may have complete and up-to-date knowledge of the theory and practice in this field of endeavor.

The work is in every day language and as free as possible from higher mathematics. The method of treatment has been to present a comprehensive treatise on the fundamental principles. With a firm grounding of these fundamental principles the practitioner is enabled to intelligently design or operate refrigerating machinery. The theoretical and fundamental operating principles are given attention first. This is followed by numerous practical considerations and the application of the fundamental principles to the economic production of ice and refrigeration for various purposes.

672 Pages — 215 Illustrations 9 Folded in charts — 6 Working charts in Cover Pocket. Substantially bound.

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The Refrigeration BRINE MEDIUM that is 5 WAYS BETTER

SOLVAY

CALCIUM CHLORIDE

1 Provides a "long-life" brine . . . *lowest cost* in long run

2 Allows safe operation at *low temperatures* . . . permits quicker freezing

3 Makes your equipment last longer

4 Easier operation . . . requires less pumping

5 Reduces possibility of costly shut-downs and repairs

SOLVAY SALES DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 Rector Street, New York 6, N. Y.

tered when the pump stops. These pumps are completely self-priming on suction lifts up to 25 feet.

Semi-enclosed, non-clogging type of impeller permits passage of usual size solids encountered in dewatering service. Impeller is adjustable for wear. Pump casing is bolted to heavy-duty support head. Shaft operates in two deep-grooved, oversized ball bearings to resist severe use. All stationary models are equipped with electric motors of proper characteristics. The portable type is equipped with a 1½ hp. four cycle, air cooled gasoline engine.

Complete performance details are published in Bulletin No. 3300-A available from the manufacturer, The Deming Co., Salem, Ohio.

New Rollaway Bar The "Koldmaster"

A NEW rollaway serving cabinet, the "Koldmaster" has been produced by the Ice Cooling Appliance Corp., Morrison, Ill. It has a hinged top lid, with chrome-plated lift. A stainless steel serving tray hooks over sides of cabinet when in use. The compartment holds 50 lbs. of block ice. The lower compartment for bottled goods, ice bucket, mixing needs, etc, is 22¾ x 16 x 16¼ inches.

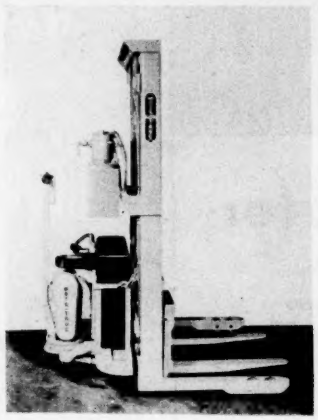
New "Koldmaster" rollaway bar built by Ice Cooling Appliance Corp.

The finish is maroon wrinkle enamel, easy to keep clean. The size of the cabinet is 35 inches high, 16 inches deep, 22¾ inches wide. High, roller-bearing swivel casters, rolls it easily from pantry to kitchen to the room in which entertaining is being done.

This new rollaway bar is offered as a thoroughly practical device, of real help to host or hostess, ideal for small apartments and available for indoor and outdoor entertaining and for auxiliary storage use.

New Developments In Motorized Truck

NEW developments are announced in its motorized Hi-Lift Walkie truck by the Moto-Truc Co., Cleveland, Ohio. The under clearance is now two inches from the bottom of



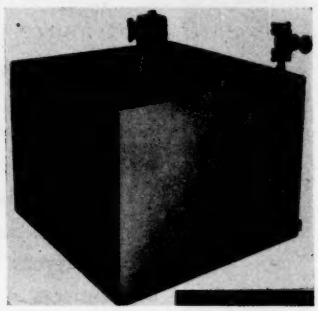
New Hi-Lift Walkie Truck

the outrigger to the floor. The hydraulic pump and tank have been placed above the battery and corner of battery carrier rounded, permitting a six-inch reduction in the turning radius. The distance from the back of forks to the front of the motor unit is only 33 inches. The capacity is 4,000 lbs., up to 80 in. lift, 2,000 lbs. up to 144 in. lift, depending upon size of outriggers and work width and length. It operates in a six ft. aisle with a 36 x 48 pallet. It has exclusive Moto-Truc easy control, with two speeds forward and two speeds reverse with an easy turn of the wrist on roller type handle.

The 12-volt interchangeable motor unit requires little battery power and is quickly accessible for inspection and servicing. Push buttons in the ends of the handle control the hydraulic lift.

Thermo-Reserve Water Cooler

A New type of thermo-reserve water cooler, the "Buildicer" has been added to its line of refrigeration equipment by The Buildice Co. Inc., Chicago, Ill. Of particular interest to the dairy industry for milk cooling operations is the steady-constant out-going water temperature from start to finish of run. This is due to the high velocity verti-flo water slinger which causes a baudelot effect of water flow over ice and impinges the water against the ice at approxi-



New Buildice Thermo-Reserve Water Cooler.

mately 4500 ft. velocity or 900 lbs. pressure. After ice is melted and coil is exposed a very high rate of heat transfer is still maintained due to baudelot and water spray over coil proper. The units are capable of handling a large quantity of re-circulated water due to the design of the water slinger and unit proper.

The unit is designed for easy cleaning and is constructed to meet all health department standards. It can be flushed and sterilized with a minimum of effort. It is completely self-contained. The tanks and cover are all welded construction and insulated with water proof insulation.

It is compact and neat in appearance and requires a minimum of floor space. Additional complete details will be supplied by the company.

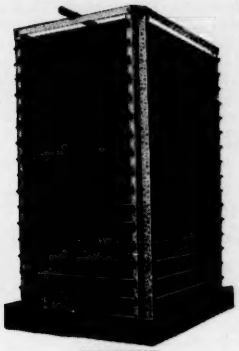
CATALOGS AND BULLETINS

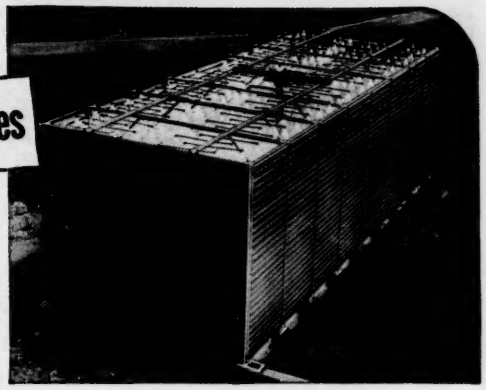
Acme Industries Evaporative Condensers and Freon Condensers

TWO new catalogs, 527-A, evaporative condensers and 23-B, Freon condensers, have been released by Acme Industries, Inc., Jackson, Mich. Acme evaporative condensers ranging from 10 to 100 tons are available in casings that are hot-dip galvanized after fabrication. Models are available for either Freon or ammonia. The evaporative condenser catalog illustrates and describes this equipment, with tables showing the dimensions and ratings and gives mechanical specifications. The Freon condenser catalog covers shell and tube models. This equipment is illustrated and fully described, with tables showing capacity and engineering data, dimensions and mean effective temperature differences. Catalogs may be obtained from any Acme representative or from the Jackson, Mich., office.

Binks NATURAL DRAFT COOLING TOWERS

30 standard sizes





Binks Type "S" Cooling Towers are manufactured in capacity ranges from 10 to 1200 GPM. This wide range of sizes enables you to choose exactly the tower you need to fit your requirements without the needless expense of a custom-built unit. Binks Type "S" Towers are the accepted standard for cooling condenser circulating water from refrigeration and air conditioning compressors, and for cooling water-jacketed engines. They will provide low cost cooling of highest efficiency for any manufacturing process where heat is dissipated by circulating water or other fluids.

Send today

for bulletins describing the Binks Type "S" natural draft cooling towers in which you are interested.

BULLETIN NUMBERS:

30. Single Section Towers
31. Multiple Section Towers (one bay wide)
32. Large Capacity Towers
40. All Redwood Towers

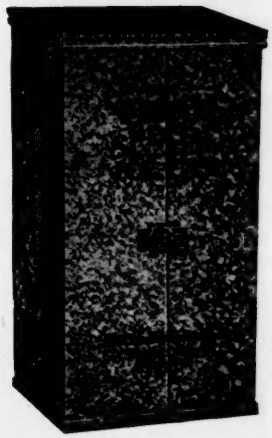
Please state how tower will be used, also capacity required.

THERE'S A BINKS TOWER FOR EVERY COOLING JOB

Binks MANUFACTURING COMPANY

REPRESENTATIVES IN ALL PRINCIPAL CITIES ■ 3130-38 CARROLL AVENUE, CHICAGO, ILL.

OHIO SPECIAL ICE CANS



Double Riveted Welded
Integral Tube Cans
Arctic Pownall Cans
Can Baskets
Condenser Trough

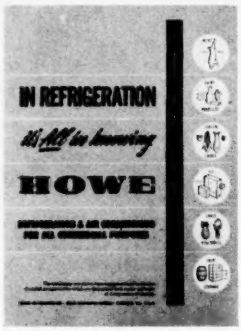
Industrial Trucks and Trailers

THE OHIO GALVANIZING & MFG. CO.

NILES — *Established 1902* — OHIO

New Howe Product Bulletin

RECENTLY issued by the Howe Ice Machine Co., 2825 Montrose Ave., Chicago 18, Ill., a new Howe bulletin illustrates current compressor models of 1 to 150 tons capacity, representing the latest developments in the 36



Front Cover of new Howe bulletin.

years of Howe manufacturing experience. Especially significant is the illustrated story of the diverse applications of Howe equipment throughout the world for food manufacture and preservation and comfort cooling.

The bulletin emphasizes construction features such as oversize suction and discharge valves of ring plate design; double trunk piston; insert type nickel babbit metal bearings; steel connecting rods; hand hole plates on both sides of crank case; oil gauge glass in crankcase and crankshaft seal, oil sealed under pressure.

Howe compressors are built for ammonia, Freon and Methyl.

Armstrong Purger Bulletin

HOW air and other non-condensables get into refrigeration systems; the adverse effect this has on operating costs and efficiency and what the Armstrong Forged Steel Purger does to prevent it is the subject of the new 8 page Armstrong Forged Steel Purger Bulletin No. 192. Also included are: installation data with illustrations and diagrams; specifications and prices; helpful charts and tables, and a brief description of other Armstrong refrigeration products. One page is devoted to telling and showing what Armstrong purgers are doing for others. Complete information will be supplied by Armstrong Machine Works, Three Rivers, Mich.

United Ice Supply Supplements Catalog

A SUPPLEMENT to its regular catalog has been issued by the United Ice Supply Co., Boston, Mass., showing expansion of its line of equipment for ice plants. Listed and described are bracket systems, valves, nozzles, hose connectors, check valves, gum tubing, rotary core pumps, centrifugal pumps, centrifugal blowers, ice crushers and shavers, and other equipment. A copy will be sent upon request to the company.

Worthington Bulletins on Coolers

A TWO-PAGE bulletin on ammonia product coolers UCY series, vertical floor model, dry type, has been issued by the Worthington Pump & Machinery Corp., Harrison, N. Y. It illustrates and describes this unit with specifications and a diagram and table showing dimensions. Another two-page bulletin covers packaged air conditioners, series RCY-200, with description, specifications and diagram showing dimensions.

MARTOCELLO ICE PICKS

"Cost You Less To Buy The Best"

Immediate Delivery on Plain Handle Ice Picks

BLADES

of High Carbon Tool Steel, accurately tempered to give you maximum use.

HANDLES

of Sound, Clear Hard Wood with Protective Flexible Lacquer Coating.

FERRULES

of Pressed Steel securely registered on Handle and Plated to Resist Corrosion.

PRICES ON PLAIN AND PRINTED HANDLES HAVE BEEN REDUCED! WRITE TODAY FOR NEW PRICES.

Jos. A. Martocello & Co. 229-231 NORTH 13th STREET PHILADELPHIA 7, PA.

Serving the Ice Industry Since 1916 "There's no Substitute for MARTOCELLO QUALITY"

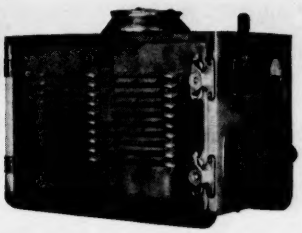
New Calendar for the Ice Industry

A WEEKLY calendar designed especially for the ice industry has been issued by The Wall Catalog Co., 59 E. Madison St., Chicago, Ill. Each of the 52 pages have sales mes-

New Weekly Ice Calendar

sages and for summer holidays it reminds in advance that more ice will be needed. Space at the top is provided for imprinting the company name and address.

control odors and mold



USE GENERAL OZON EQUIPMENT wherever eggs, vegetables, cheese, fruits, meats and fish are stored . then watch food spoilage go down and profits go up.

Let General Ozone engineers solve your odor and mold problems. General Ozone has a complete line of modern ozonizing equipment plus full service facilities for both old and new types. Write us today for further information.

GENERAL OZONE CORPORATION

7 West Sixtieth St., New York 23, N. Y. 1455 West Congress St., Chicago 7, Ill.

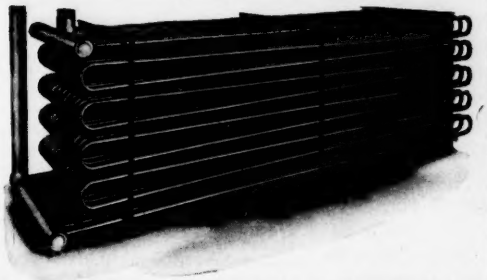
MODEL C-2
Approved by Underwriters' Laboratories, Inc.

Manufacturers of ozone generating equipment for cold-storage • warehouse refrigerated cars • walk-in coolers • air recirculating systems • homes • garages • hospitals

REMPE PIPE COILS

MOST EFFICIENT!
for replacements
for new installations

WHY? It's the way we build them—the precision bending—the expert welding—the thorough testing under water with 350 lbs. air pressure—over 60 years experience in building coils for refrigeration.

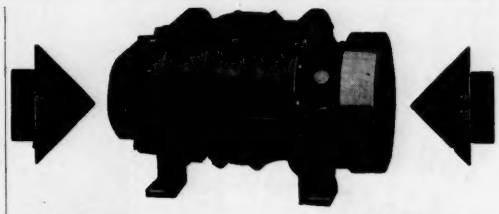


This coil is typical of the many varieties of coils produced by us. Coils, bends or fabricated pipe—coil and tank assemblies are designed and built to your requirements. Send details for engineering assistance and quotation.

REMPE CO.

348 N. Sacramento Blvd., Chicago 12, Ill.

Pipe and Fin Coils for Refrigeration and Air Conditioning.



Air Delivered As Required with R-C Blowers

You can depend upon the constant volume of your air supply from Roots-Connersville Blowers. Every revolution of the impellers delivers a predetermined amount of air, which may be varied to meet seasonal requirements. Additional advantages of trouble-free operation, low power cost and long life account for the unmatched popularity of R-C Blowers for ice-plant service. Ask for your copy of Bulletin RC-1247, without obligation.

ROOTS-CONNERSVILLE BLOWER CORP.
One of the Dresser Industries
980 Columbia Avenue Connersville, Indiana

ROOTS-CONNERSVILLE

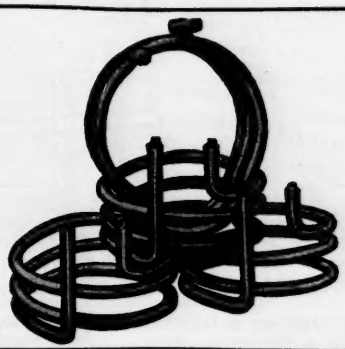
BLOWER BUILDERS SINCE 1854

PITTSBURGH *Air Pressure Tested* **COILS**

Electrically welded, continuous; Air-Pressure-Tested while submerged in water. Built to your specifications. Send for new Coil Data Book and let us quote.

Welded Headers—Welded Ammonia Receivers
Accumulators—Pipe Coils—Bends—Boilers Tubes

Pittsburgh Pipe Coil & Bending Company
61 BRIDGE STREET, ETNA, PITTSBURGH 25, PA



MANUFACTURERS' NEWS

New Worthington Officers Elected

THE Worthington Pump & Machinery Corp., Harrison, N. J. announces the election of Hobart C. Ramsey as president. Mr. Ramsey joined the company in 1920 after serving in World War I as a Lieutenant Commander. His first job was as a sales engineer in the export department, becoming manager of that department in 1922. From 1925 to 1937, he served successively as assistant general sales manager, vice president in charge of international business, and vice president in charge of engineering and manufacturing operations, including seven years in Europe with Worthington's foreign operations. In 1945, he was elected executive vice president; and now succeeds Clarence E. Searle as president. Mr. Searle has been named vice chairman of the board of directors.

Hobart C. Ramsey

John J. Summersby

Mr. Ramsey is a native of New Jersey and graduated from the United States Naval Academy at Annapolis, in 1915, where he had earned a prominent reputation on the varsity football squad and in other sports. His association activities include past president and chairman of the Navy Industrial Association; a director of National Association of Manufacturers; chairman of Committee on Patents and Research of N. A. M.; chairman of the Panel on Mechanical Equipment of the Research and Development Board of the National Military Establishment.

Succeeding Mr. Ramsey as executive vice president is Edwin J. Schwanhausser, vice president in charge of sales since 1945, when he was transferred from Buffalo Works. He started with Worthington in 1915 as an engineer at the Harrison Works and has served successively as assistant manager at Harrison Works, manager of Buffalo Works, and has served as a vice-president since 1939.

John J. Summersby has been elected vice-president in charge of sales. Having joined the Worthington organization in 1916 and spending a year at the corporation's former Cincinnati Works, he has been connected with the sales department ever since—first as a salesman and later as district office manager at St. Paul; sales manager at Holyoke Works; and assistant general sales manager. In 1937 he was appointed assistant vice president and general sales manager.

Whatever You Need in Refrigeration

Creamery Package

CP either makes or can provide you with leading makes of

Shell and Tube Condensers

•

Evaporator Condensers

•

Ammonia Fittings

•

Ammonia Conirols

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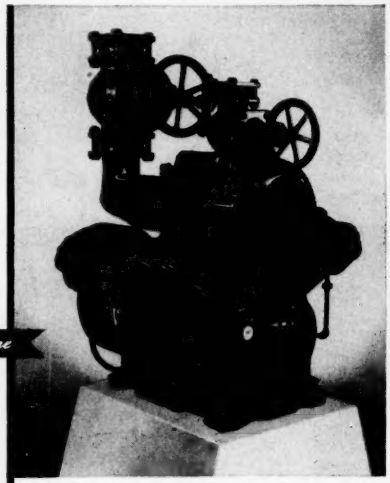
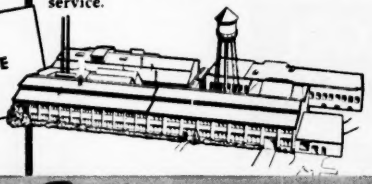


CP offers you an extensive line of vertical two-cylinder Compressors, Self-contained Marine Units and Multi-cylinder Compressors and Boosters plus CP Engineering to cooperate in planning efficient economical refrigeration systems.

The modern CP factory (pictured below), which is devoted exclusively to the manufacture of refrigeration machinery, combines with a coast to coast network of 21 company owned and operated branches to give owners of CP Refrigeration Equipment the important advantage of one source of *complete* supply and service.

The Home of CREAMERY PACKAGE REFRIGERATION



THE Creamery Package MFG. COMPANY

General and Export Offices: 1243 W. Washington Blvd., Chicago 7, Illinois

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CREAMERY PACKAGE MFG. CO. OF CANADA, LTD.
267 King St., West, Toronto 2, Ontario

THE CREAMERY PACKAGE MFG. COMPANY, LTD.
Avery House, Clerkenwell Green, London, England

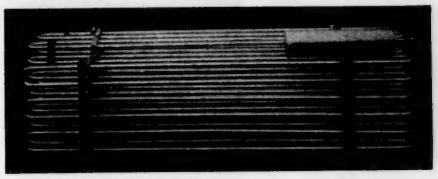
Kehoe in New Offices

THE Robert P. Kehoe Machinery Co. Inc., announces consolidation of its offices and warehouse in its own modern building located at 6 Eucker St. and Bergen Turnpike, Ridgefield Park, N. J.

QUALITY COILS FOR *ALL* APPLICATIONS

WELDED HEADERS, PIPE BENDS AND AMMONIA RECEIVERS

Whether your next job be for a single bend, or coil or complete piping system, Chicago Nipple can supply your requirements. Experienced workmen, practical engineers, and modern equipment reflect the quality of our products.



Coils are of selected ammonia pipe—all joints are electrically welded—checked under water with an air pressure of 300 pounds to guarantee tightness.

SEND DRAWING OR BLUE PRINT FOR QUOTATION

CHICAGO NIPPLE MFG. CO.
1997 Clybourn Ave., Chicago 14, Ill.

PROTECT

TANK TOPS • LIDS WALLS • MACHINERY FLOORS

AND OTHER SURFACES . . . KEEP THEM CLEANER . . . They'll Even LAST LONGER

When Properly Painted! CSCO GREY PAINT Is Made Especially For Ice Plant Service!

GUARANTEED AS GOOD
OR BETTER THAN ANY OTHER PAINT OR COATING ON THE MARKET OR YOUR MONEY REFUNDED!

CSCO CAN, COIL AND CONDENSER COATING IS A BLACK PHENOLITHIC COMPOUND . . . Excellent For Coating:
Ice Cans Above or Below Brine Levels.
Also Condensers and All Other Surfaces Immersed in Either Brine or Water or Exposed to the Atmosphere.

PACKAGED IN ALL SIZE CONTAINERS.

CHEMICAL SOLVENT COMPANY
3005—16th Street North — Birmingham, Ala.

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ENGINEERS
REFRIGERATION SPECIALISTS
Design *Construction* *Management*
Examinations *Reports* *Valuations*
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Consulting Engineers
112-114 WEST 42nd ST. NEW YORK CITY 18
Ice Making and Refrigeration - Industrial Power Plants
Reports, Appraisals and Management

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For the Engineer
REFRIGERATION MEMORANDA
(12th edition)
By JOHN LEVEY
A handy book containing a surprising amount of useful data required in everyday practice.
FLEXIBLE LEATHER—ONE DOLLAR
Nickerson & Collins Co., Publishers, 435 Waller Ave., Chicago

ELIMINATE SOLAR HEAT LOAD—COOL THE ROOF
RUPPRIGHT'S ROTARY ROOF COOLER
will relieve your compressors when they need it most.
Write for bulletin to: Box 6795,
Los Angeles 22, Calif.

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ICE BREAKERS
- *SAVE TIME*
- *SAVE LABOR*
- *SAVE ICE*

10 MODELS TO CHOOSE FROM
Write for Descriptive Circular

MODEL W-90-M
ADJUSTABLE GRATE—
For TRUCK MOUNTING

MICRON, INC., Dept. I
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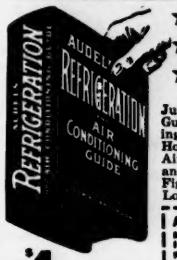

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REFRIGERATION
and AIR CONDITIONING GUIDE

ANSWERS YOUR QUESTIONS

Just Out! Audels Refrigeration & Air Conditioning Guide for Engineers, Servicemen & Shopmen. Covering Principles, Servicing, Operation & Repairs of Household Special, Commercial & Industrial Units & Air Conditioning. 1280 Pages. All Fully Illustrated and Indexed for Ready Reference. Valuable Facts & Figures including data on Freon, Quick Freezing, Lockers, Water Coolers & Air Conditioning Systems.

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MAIL AUDELS NEW REFRIGERATION GUIDE for free examination. If O.K. I will send you $1 in 7 days; then remit $1 monthly until price of $4 is paid. Otherwise I will return it.

Name _____
Address _____
Occupation _____
Employed by _____

Baker Announces New Distributor

THE appointment of distributor coverage of the State of New Hampshire for its line of Freon products is announced by the Baker Refrigeration Corp.

H. E. Humphreys Company of Concord, is well known throughout New Hampshire, having distributed Tyler Refrigerated store fixtures and display cases for the past 15 years. In addition the Humphreys Company has statewide dealer coverage on home freezers, and has installed a large number of cold storage and locker plants. The addition of the Baker Freon line, including the new Bakeraire and Central-Air (packaged air conditioning equipment) and the Baker "Ice Flo" (ice cube maker, new this season) will enable the company to expand beyond its former fields, while more completely providing for the needs of its established customers, according to H. E. Humphreys, president.

The most complete engineering installation, and service facilities in Northern New England are maintained by the company which has completed over 3500 successful installations to date.

Trouble Free Service and INCREASED CAPACITY after installing J. H. H. VOSS VALVES REG. U.S. PAT. OFF.

DESIGNED BY ENGINEERS MADE BY CRAFTSMEN

in their COMPRESSORS

Replace those inefficient, troublesome valves and you too will get the utmost in economy, efficiency and safety of operation...you will get better results at lower power costs . . . you will get increased capacity . . . with VOSS VALVES.

This letter tells why

The WHITE BELT Dairy
Miami, Florida September 6, 1947

J. H. H. Voss Co., Inc.

In 1934 Voss Valves were installed in our 10 x 10 York ammonia compressor. This installation proved so satisfactory that we have installed Voss Valves in three other machines. To be specific in another 10 x 10, a 9 x 9 and a 7½ x 7½.

We wish to express our appreciation for the trouble free service and increased production that the installation of your valves have brought about.

As we add more machines to our refrigeration equipment they will be equipped with your valves.

WHITE BELT DAIRY,
John G. DuPuis, Jr., Manager

We will be glad to submit estimates if you will send us the name, bore, stroke and speed of your air, gas or ammonia compressors of any type or size.

J. H. H. VOSS CO., Inc. 785 East 144th Street NEW YORK 54, N. Y.

Vilter Appoints St. Louis Manager

THE Vilter Manufacturing Co., Milwaukee, Wis., has appointed Frank D. Ross as district manager of the firm's St. Louis office. His appointment provides Vilter with more complete representation in the St. Louis area. Previously, the office duties were assumed on a part time basis by the company's Southern Wisconsin-Iowa Territory Manager, H. H. McKinnies.

Frank D. Ross

Mr. Ross has been in the refrigeration business since 1927. He spent the past 3½ years as manager of a refrigeration and air conditioning distributorship in Honolulu, but prior to the war he was with the Vilter Distributor in New York City.

Liles Represents Chicago Nipple

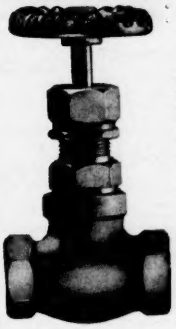
ROBERT LILES, New Orleans, La., has been appointed a manufacturer's representative for the line of products of the Chicago Nipple Manufacturing Co. in the states of Louisiana and Mississippi, it was announced by R. H. Sonneborn, general manager of sales. This company, with plants in Chicago and Cicero, Ill., Baltimore, Md., and Houston, Texas, produces reamed and chamfered nipples, pipe coils, fabricated piping, and perforated hanger iron.

Rhodes Retires from Kinetic Chemicals

THE appointment of Dr. Edmond G. Young to be in charge of sales of "Freon" fluorinated hydrocarbon propellants has been announced by Kinetic Chemicals, Inc. The propellants are widely used in aerosol "bombs". The selection of Dr. Young, who also has been made responsible for providing technical service in the use of the propellants, follows the recent retirement of W. Warren Rhodes. Sales of "Freon" for refrigeration and air-conditioning equipment will remain in charge of Robert L. Williams.

SHANK REFRIGERATION PRODUCTS

A good Valve-Saves a lot of trouble!



Semi-Steel

SHUTOFF VALVE

Highest grade non-porous metal—full size ports—clean cut threads. Back seated stem — Shank design base — perfect alignment. Long life packing ring.

PURGE VALVES

Compact — Machined from bar stock steel — Full size ports — Completely rust-proofed — Highest grade graphited composition packing. All popular sizes.

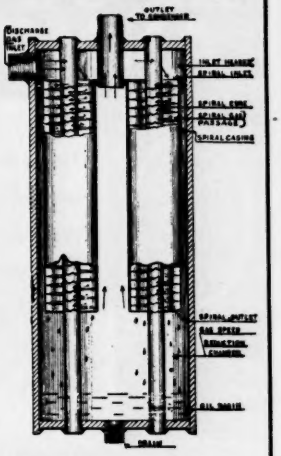
Write for prices

CYRUS SHANK CO.
629 W. Jackson Blvd., Chicago 6, Ill.

"King Zeero"

OIL SEPARATOR

STOPS OIL FROM ENTERING CONDENSER RECEIVER AND LOW SIDE



Allows operation as was originally intended. Simple in operation — no parts to wear out — no screens, metal wool or any close screens to clog, raise discharge pressures and cut down capacity.

When used in connection with air compressors, water is also separated with the oil.

Built for years of trouble free service. Mechanical details on request.

THE KING ZEERO COMPANY
1447-55 Montrose Ave., Chicago 13, Ill.

QUALITY ICE PICKS—Plain—Printed

Nationally Known for the Best

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UNITED ICE SUPPLY CO.

55 Beverly St., Boston 14, Mass.

THE INDEX LINE
ICE DEALERS SUPPLIES

Only the Highest Quality Merchandise and efficient service necessary for the proper and profitable operation of your business. Write for our 1949 catalog.

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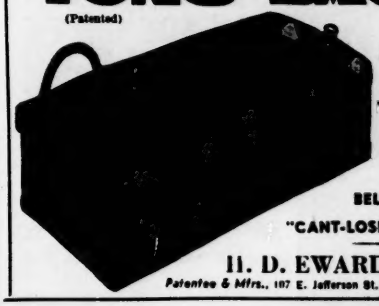
(Patented)



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"SNUG-FIT" BELT PURSES

"CANT-LOSE" WALLETS

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WE CONTINUE YEAR AFTER YEAR
to make the kind of Ice Picks that will give YOUR customers satisfaction and build up GOOD WILL FOR YOU.

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Est. 1858

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29th & GRAY'S FERRY ROAD
PHILADELPHIA, PA.

TOUGH RUGGED
Stag Brand
KORO SEAL
TREATED CANVAS
AND
NO-FADE GREEN
TREATED CANVAS
ICE BAGS
can take it rough!

For the "thrifty" buyer who demands low maintenance cost — these "STAG BRAND" Metal Bottom ICE BAGS and BLOCK ICE CARRIERS are leaders!

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THE BUYERS

INDEX TO ADVERTISEMENTS OF THESE FIRMS—PAGE 88

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Vogt Machine Co., Henry, Louisville, Ky.

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Refrigeration Engineering Corp., Philadelphia, Pa.

AIR CIRCULATORS
Reynolds Electric Co., River Grove, Ill.

AIR COMPRESSORS
Baker Refrigeration Corp. So. Windham, Maine
Frick Co., Waynesboro, Pa.
Worthington Pump and Machinery Corp., Harrison, N. J.

AIR CONDITIONING EQUIPMENT
Baker Refrigeration Corp. So. Windham, Maine
Frick Co., Waynesboro, Pa.
Howe Ice Machine Co., Chicago, Ill.
Niagara Blower Co., New York, N.Y.

AIR PURIFYING EQUIPMENT
General Ozone Corp., Chicago, Ill.

AMMONIA COMPRESSOR VALVES
Frick Co., Waynesboro, Pa.
Voss, Inc., J. H. H., New York, N. Y.

AMMONIA COMPRESSORS
Baker Refrigeration Corp. So. Windham, Maine
Creamery Package Mfg. Co., Chicago, Ill.
Dersch, Gesswein & Neuert, Inc. Chicago, Ill.
Frick Co., Waynesboro, Pa.
Howe Ice Machine Co., Chicago, Ill.
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.
Reynolds Mfg. Co., Springfield, Mo.
Vogt Machine Co., Henry, Louisville, Ky.

AMMONIA CONTROL DEVICES
Dersch, Gesswein & Neuert, Inc. Chicago, Ill.

AMMONIA FLOAT VALVES
Acme Industries, Inc., Jackson, Mich.
Armstrong Machine Works, Three Rivers, Mich.
Frick Co., Waynesboro, Pa.
Phillips & Co., H. A., Chicago, Ill.
Vogt Machine Co., Henry, Louisville, Ky.
Voss, Inc., J. H. H., New York, N. Y.

AMMONIA GAUGES—INDICATING AND RECORDING
Frick Co., Waynesboro, Pa.
Martocello & Co., Jos. A., Philadelphia, Pa.

AMMONIA MANUFACTURERS
Armour Ammonia Div., Armour & Co., Chicago, Ill.
Barrett Div., The, Allied Chemical & Dye Corp., New York, N. Y.
Bower Chemical Mfg. Co., Henry, Philadelphia, Pa.
Mathieson Chemical Corp. New York, N. Y.
National Ammonia Div., DuPont, Wilmington, Del.

AMMONIA PURIFIERS
Dersch, Gesswein & Neuert, Inc. Chicago, Ill.
Frick Co., Waynesboro, Pa.
Howe Ice Machine Co., Chicago, Ill.
Vogt Machine Co., Henry, Louisville, Ky.

AMMONIA RECEIVERS
Acme Industries, Inc., Jackson, Mich.
Baker Refrigeration Corp. So. Windham, Maine
Creamery Package Mfg. Co., Chicago, Ill.
Dersch, Gesswein & Neuert, Inc. Chicago, Ill.
Frick Co., Waynesboro, Pa.
Howe Ice Machine Co., Chicago, Ill.
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.
National Pipe Bending Co., New Haven, Conn.
Pittsburgh Pipe Coil & Bending Co., Pittsburgh, Pa.
Rempe Company, Chicago, Ill.
Reynolds Mfg. Co., Springfield, Mo.
Vogt Machine Co., Henry, Louisville, Ky.

AMMONIA VALVES & FITTINGS
Dersch, Gesswein & Neuert, Inc. Chicago, Ill.
Shenk Co., Cyrus, Chicago, Ill.

ARCHITECTS AND ENGINEERS
Greene, Van R. H., New York, N. Y.
Ophuis & Associates, Fred, New York, N. Y.

AUTOMATIC CONTROL DEVICES
Alco Valve Co., St. Louis, Mo.
Armstrong Machine Works, Three Rivers, Mich.
Baker Refrigeration Corp. So. Windham, Maine
Frick Co., Waynesboro, Pa.
Phillips & Co., H. A., Chicago, Ill.
Reynolds Electric Co., River Grove, Ill.

BAGS, ICE
Pittsburgh Waterproof Co., Pittsburgh, Pa.
Union Bag & Paper Corp., New York, N. Y.
United Ice Supply Co., Boston, Mass.

BAGS, WATERPROOF PAPER
Union Bag & Paper Co. New York, N. Y.

BEER COOLERS
Frick Co., Waynesboro, Pa.
Vogt Machine Co., Henry, Louisville, Ky.

BLOWERS
Frick Co., Waynesboro, Pa.
Martocello & Co., Jos. A., Philadelphia, Pa.
Refrigeration Engineering Corp., Philadelphia, Pa.
Roots-Connersville Blower Corp., Connersville, Ind.

BOILERS
Frick Co., Waynesboro, Pa.
Vogt Machine Co., Henry, Louisville, Ky.

BOILER TUBES
Byers Co., A. M., Pittsburgh, Pa.

BOOKS—TECHNICAL
Audel Publishers, New York, N. Y.
Nickerson & Collins Co., Chicago, Ill.

BRINE CIRCULATORS
Creamery Package Mfg. Co., Chicago, Ill.
Frick Co., Waynesboro, Pa.
Martocello & Co., Jos. A., Philadelphia, Pa.
Refrigeration Engineering Corp., Philadelphia, Pa.
Reynolds Mfg. Co., Springfield, Mo.
Roots-Connersville Blower Corp., Connersville, Ind.
Vogt Machine Co., Henry, Louisville, Ky.

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Kehoe Machinery Co., Inc., R. P.,
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Refrigeration Engineering Corp.,
Philadelphia, Pa.
Reynolds Mfg. Co., Springfield, Mo.
Vogt Machine Co., Henry,
Louisville, Ky.

BRINE SPRAY COOLING
Acme Industries, Inc., Jackson, Mich.
Frick Co., Waynesboro, Pa.
Martocello & Co., Jos. A.,
Philadelphia, Pa.

BRINE TREATMENT
Chemical Solvent Co.,
Birmingham, Ala.

CALCIUM CHLORIDE
Solvay Sales Div., Allied Chemical &
Dye Corp., New York, N. Y.

CAN DUMPS
(See Dumps, Can)

CAR ICING EQUIPMENT
Gifford-Wood Co., Hudson, N. Y.
Lilly Co., The, Memphis, Tenn.
Link-Belt Co., Chicago, Ill.

CHEMICALS
Barada & Page, Inc.,
Kansas City, Mo.

COAL HANDLING MACHINERY
Gifford-Wood Co., Hudson, N. Y.

COILS
Acme Industries, Inc., Jackson, Mich.
Byers Co., A. M., Pittsburgh, Pa.
Chicago Nipple Mfg. Co.
Chicago, Ill.
Creamery Package Mfg. Co.,
Chicago, Ill.
Howe Ice Machine Co., Chicago, Ill.
National Pipe Bending Co.,
New Haven, Conn.
Philadelphia Pipe Bending Co.,
Philadelphia, Pa.
Pittsburg Pipe Coil & Bending Co.,
Pittsburg, Pa.

COLD STORAGE CONSTRUCTION
Armstrong Cork Co., Lancaster, Pa.
Frick Co., Waynesboro, Pa.
Mundet Cork Corp., Brooklyn, N. Y.
Refrigeration Engineering Corp.,
Philadelphia, Pa.
Vogt Machine Co., Henry,
Louisville, Ky.

COLD STORAGE DOORS
Butcher Boy Cold Storage Door Co.,
Chicago, Ill.
Jamison Cold Stge. Door Co.,
Hagerstown, Md.
Refrigeration Engineering Co.,
Minneapolis, Minn.

COMPRESSORS
(See Ice Making and
refrigerating Machinery)
(See Air Compressors)

CONDENSERS
Acme Industries, Inc., Jackson, Mich.
Baker Refrigeration Corp.
So. Windham, Maine
Creamery Package Mfg. Co.,
Chicago, Ill.
Dersch, Gesswein & Neuert, Inc.
Chicago, Ill.
Frick Co., Waynesboro, Pa.
Howe Ice Machine Co., Chicago, Ill.
Kehoe Machinery Co., Inc. R. P.,
Ridgefield Park, N. J.
King-Zeero Co., Chicago, Ill.
National Pipe Bending Co.,
New Haven, Conn.
Philadelphia Pipe Bending Co.,
Philadelphia, Pa.
Pittsburgh Pipe Coil & Bending Co.,
Pittsburgh, Pa.
Reynolds Mfg. Co., Springfield, Mo.
Vogt Machine Co., Henry,
Louisville, Ky.

CONSULTING ENGINEERS
Greene, Van R. H., New York, N. Y.
Ophuis & Associates, Fred,
New York, N. Y.

CONVEYORS
Gifford-Wood Co., Hudson, N. Y.
Lilly Co., The, Memphis, Tenn.
Link-Belt Co., Chicago, Ill.

COOLING TOWERS
Binks Mfg. Co., Chicago, Ill.
Frick Co., Waynesboro, Pa.

CORK INSULATION
Armstrong Cork Co., Lancaster, Pa.
Cork Import Corp., New York, N.Y.
Mundet Cork Corp., Brooklyn, N.Y.

COUPON BOOKS
Index Coupon & Supply Co.,
La Porte, Ind.
United Ice Supply Co., Boston, Mass.
Vivian Mfg. Co., St. Louis, Mo.

COVERINGS (PIPE AND BOILERS)
American Hair & Felt Co.,
Chicago, Ill.
Armstrong Cork Co., Lancaster, Pa.
Cork Import Corp., New York, N.Y.
Mundet Cork Corp., Brooklyn, N.Y.

CYLINDERS (GAS & LIQUID)
Byers Co., A. M., Pittsburgh, Pa.

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Caterpillar Tractor Co., Peoria, Ill.
Worthington Pump and Machinery
Corp., Harrison, N. J.

DIP TANKS AND CAN BASKETS
Frick Co., Waynesboro, Pa.
Knickerbocker Stamping Co.,
Parkersburg, W. Va.
Martocello & Co., Jos. A.,
Philadelphia, Pa.
Ohio Galvanizing & Mfg. Co.,
Niles, Ohio
Refrigeration Engineering Corp.,
Philadelphia, Pa.
Vogt Machine Co., Henry,
Louisville, Ky.

DISPLAY CASES
Trusty Manufacturers, Inc.,
La Porte, Ind.

DRIVES, TRANSMISSIONS
Frick Company, Waynesboro, Pa.
Link-Belt Co., Chicago, Ill.

DUMPS, CAN
Frick Co., Waynesboro, Pa.
Gifford-Wood Co., Hudson, N. Y.
Kehoe Machinery Co., Inc., R. P.,
Ridgefield Park, N. J.
Martocello & Co., Jos. A.,
Philadelphia, Pa.
Ohio Galvanizing & Mfg. Co.,
Niles, Ohio

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WOLF-LINDE
Est. 1880
"THE OLDEST NAME IN REFRIGERATION"

- AMMONIA COMPRESSORS
- AMMONIA VALVES
  Flanged and screw ends in all sizes from ¼" to 8"
- BACK PRESSURE VALVES
  For ammonia and Freon in all sizes from ¾" to 6"
- FLANGES AND FITTINGS

Manufactured and Sold by
DERSCH, GESSWEIN & NEUERT, Inc.
4849 West Grand Avenue Chicago 39, Illinois

ICE DEALERS

In addition to helping save food, top-icing with snow-ice cuts car icing cost 42% (from a time study) and has further advantages such as:
—the blast of ice and cold air forces all warm air from car.
—only a few minutes required to top-ice a car.
—snow-ice melts gradually and uniformly (chunk ice leaves holes between cakes). Products arrive as fresh and crisp as when loaded.

ASK FOR BOOK No. 2261 illustrating this effective method of building up your ice business.

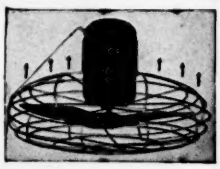
LINK-BELT ICE CRUSHER-SLINGER

LINK-BELT COMPANY
Chicago 8, Indianapolis 6, Philadelphia 40, Atlanta, Dallas 1, Houston 3, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8. Offices in Principal Cities. 21,040

HERE'S Certified REFRIGERATION

★ NO WET CEILINGS
★ NO FROST ON COILS
★ NO ODORS
★ NO FLAVOR TRANSFERENCE

WITH THE



Reco* REFRIGERATOR FAN

Every cold storage room needs forced air circulation to avoid the troubles mentioned above. The RECO—and only the RECO—provides complete air circulation, because only the RECO blows upwards.

The RECO forces the air along the ceiling, down the walls anl slowly up to the fan again. The air is continually moving over the coils and around and between all stored products.

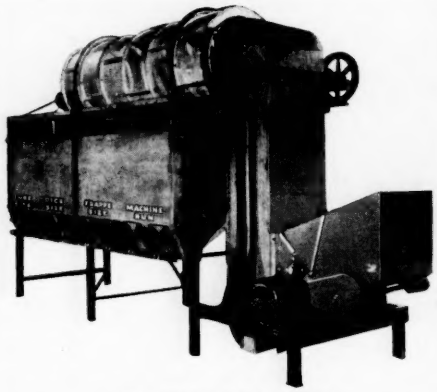
REYNOLDS ELECTRIC COMPANY

3060 River Rd. River Grove, Ill.

*Reg. U. S. Pat. Off.

FREE

Write for Bulletin 241 giving typical installations, flow charts, data tables, etc.



Model 23CE10 Lilly ICIZER

The engineering principles and materials used in building Lilly ICIZERS have proved as sound as the idea itself of sizing ice.

Complete catalog of all models sent on request.

THE LILLY COMPANY
466 Union Avenue Memphis 7, Tenn.

ICE TOOLS
PLANT SUPPLIES
Write for Cat. 101

THE BUYERS

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Refrigeration Engineering Corp., Philadelphia, Pa.
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ENGINEERS AND ARCHITECTS
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Caterpillar Tractor Co., Peoria, Ill.
Frick Co., Waynesboro, Pa.

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Niagara Blower Co., New York, N.Y.

EVAPORATORS
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Creamery Package Mfg. Co., Chicago, Ill.
Frick Co., Waynesboro, Pa.
Niagara Blower Co., New York, N.Y.
Vogt Machine Co., Henry, Louisville, Ky.

FEED-WATER HEATERS
National Pipe Bending Co., New Haven, Conn.
Vogt Machine Co., Henry, Louisville, Ky.

FIBERGLAS
Armstrong Cork Co., Lancaster, Pa.

FIELD ICE SAWS
Gifford-Wood Co., Hudson, N. Y.
United Ice Supply Co., Boston, Mass.

FILTERS, WATER
Frick Co., Waynesboro, Pa.
Martocello & Co., Jos. A., Philadelphia, Pa.

FIN COILS
Acme Industries, Inc., Jackson, Mich.
Howe Ice Machine Co., Chicago, Ill.
Rempe Company, Chicago, Ill.

FOOD FREEZING EQUIPMENT
Baker Refrigeration Corp. So. Windham, Maine
Frick Co., Waynesboro, Pa.
Howe Ice Machine Co., Chicago, Ill.
Vogt Machine Co., Henry, Louisville, Ky.
Worthington Pump and Machinery Corp., Harrison, N. J.

FROZEN FOOD LOCKERS
Knickerbocker Stamping Co., Parkersburg, W. Va.
Rempe Company, Chicago, Ill.

FUEL OIL PRE-HEATERS
National Pipe Bending Co., New Haven, Conn.

GAS AND OIL ENGINES
Caterpillar Tractor Co., Peoria, Ill.
Worthington Pump and Machinery Corp., Harrison, N. J.

HAND TRUCKS
Ohio Galvanizing & Mfg. Co., Niles, Ohio

HOISTING APPARATUS
Reynolds Mfg. Co., Springfield, Mo.

ICE BAGS
Pittsburg Waterproof Co., Pittsburg, Pa.
Union Bag & Paper Corp., New York, N. Y.

ICE BLOWERS
Gifford-Wood Co., Hudson, N. Y.
Link-Belt Co., Chicago, Ill.

ICE CAN FILLERS
Frick Co., Waynesboro, Pa.
Knickerbocker Stamping Co., Parkersburg, W. Va.
Martocello & Co., Jos. A., Philadelphia, Pa.
Ohio Galvanizing & Mfg. Co., Niles, Ohio
Refrigeration Engineering Corp., Philadelphia, Pa.
Vogt Machine Co., Henry, Louisville, Ky.

ICE CANS
Frick Co., Waynesboro, Pa.
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.
Knickerbocker Stamping Co., Parkersburg, W. Va.
Martocello & Co., Jos. A., Philadelphia, Pa.
Ohio Galvanizing & Mfg. Co., Niles, Ohio
Refrigeration Engineering Corp., Philadelphia, Pa.

ICE CHIPPERS
Gifford-Wood Co., Hudson, N. Y.
Martocello & Co., Jos. A., Philadelphia, Pa.
Refrigeration Engineering Co., Minneapolis, Minn.
Refrigeration Engineering Corp., Philadelphia, Pa.
United Ice Supply Co., Boston, Mass.
Vivian Mfg. Co., St. Louis, Mo.

ICE CHUTES
Frick Co., Waynesboro, Pa.
Gifford-Wood Co., Hudson, N. Y.
Jamison Cold Storage Door Co., Hagerstown, Md.
Link-Belt Co., Chicago, Ill.
Martocello & Co., Jos. A., Philadelphia, Pa.
Refrigeration Engineering Corp., Philadelphia, Pa.

ICE CONVEYORS
Gifford-Wood Co., Hudson, N. Y.
Lilly Co., The, Memphis, Tenn.
Link-Belt Co., Chicago, Ill.
Refrigeration Engineering Co., Minneapolis, Minn.
United Ice Supply Co., Boston, Mass.

ICE CREAM PLANTS
Baker Refrigeration Corp. So. Windham, Maine
Frick Co., Waynesboro, Pa.
Vogt Machine Co., Henry, Louisville, Ky.

ICE CRUSHERS
Bateman Foundry & Machine Co., Inc., Mineral Wells, Texas
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Micron, Inc., Bettendorf, Iowa
Refrigeration Engineering Corp., Philadelphia, Pa.
United Ice Supply Co., Boston, Mass.
Vivian Mfg. Co., St. Louis, Mo.

ICE CUBE CONTAINERS
Lilly Co., The, Memphis, Tenn.
Pittsburgh Waterproof Co., Pittsburgh, Pa.
Union Bag & Paper Co., New York, N. Y.
United Ice Supply Co., Boston, Mass.
Vivian Mfg. Co., St. Louis, Mo.

ICE CUBERS
Flynn & Emrich Co., Baltimore, Md.
Gifford-Wood Co., Hudson, N. Y.
Lilly Co., The, Memphis, Tenn.
Martocello & Co., Jos. A., Philadelphia, Pa.
Pace Brothers, Los Angeles, Calif.
Refrigeration Engineering Corp., Philadelphia, Pa.
Thermo Cuber Co., Chicago, Ill.
United Ice Supply Co., Boston, Mass.
Vivian Mfg. Co., St. Louis, Mo.

ICE CUBING MACHINES
Flynn & Emrich Co., Baltimore, Md.
Gifford-Wood Co., Hudson, N. Y.
Lilly Co., The, Memphis, Tenn.
Pace Brothers, Los Angeles, Calif.
Thermo Cuber Co., Chicago, Ill.
United Ice Supply Co., Boston, Mass.

ICE DELIVERY BAGS
Eward Co., H. D., Ft. Wayne, Ind.
Gifford-Wood Co., Hudson, N. Y.
Index Coupon & Supply Co., La Porte, Ind.
Lilly Co., The, Memphis, Tenn.
Martocello & Co., Jos. A., Philadelphia, Pa.
Pittsburgh Waterproof Co., Pittsburgh, Pa.
Union Bag & Paper Corp., New York, N. Y.
United Ice Supply Co., Boston, Mass.
Vivian Mfg. Co., St. Louis, Mo.

ICE ELEVATORS AND CONVEYORS
Gifford-Wood Co., Hudson, N. Y.
Link-Belt Co., Chicago, Ill.

ICE HARVESTING MACHINERY & TOOLS
Gifford-Wood Co., Hudson, N. Y.
United Ice Supply Co., Boston, Mass.

ICE MAKING AND REFRIGERATING MACHINERY
Baker Ice Machine Co., Inc., South Windham, Maine
Creamery Package Mfg. Co., Chicago, Il.
Dersch, Gasswein & Neuert, Inc. Chicago, Ill.
Frick Company, Waynesboro, Pa.
Howe Ice Machine Co., Chicago, Ill.
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.
Martocello & Co., Jos. A., Philadelphia, Pa.
Pace Brothers, Los Angeles, Calif.
Refrigeration Engineering Corp., Philadelphia, Pa.
Reynolds Mfg. Co., Springfield, Mo.
Vogt Machine Co., Henry, Louisville, Ky.
Worthington Pump and Machinery Corp., Harrison, N. J.

ICE PICKS AND PLANERS
Gifford-Wood Co., Hudson, N. Y.
Index Coupon & Supply Co., La Porte, Ind.
Lilly Co., The, Memphis, Tenn.
Martocello & Co., Jos. A., Philadelphia, Pa.
United Ice Supply Co., Boston, Mass.
Vivian Mfg. Co., St. Louis, Mo.

ICE PICK SCABBARDS
Gifford-Wood Co., Hudson, N. Y.
Martocello & Co., Jos. A., Philadelphia, Pa.
United Ice Supply Co., Boston, Mass.
Vivian Mfg. Co., St. Louis, Mo.

ICE PLANTS
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.
Refrigeration Engineering Corp. Philadelphia, Pa.

ICE RECORDING MACHINERY
Jamison Cold Storage Door Co., Hagerstown, Md.

ICE SCALES
Gifford-Wood Co., Hudson, N. Y.
Lilly Co., The, Memphis, Tenn.
Martocello & Co., Jos. A., Philadelphia, Pa.
United Ice Supply Co., Boston, Mass.
Vivian Mfg. Co., St. Louis, Mo.

ICE TOOLS
Gifford-Wood Co., Hudson, N. Y.
Index Coupon & Supply Co., La Porte, Ind.
Lilly Co., The, Memphis, Tenn.
Martocello & Co., Jos. A., Philadelphia, Pa.
United Ice Supply Co., Boston, Mass.
Vivian Mfg. Co., St. Louis, Mo.

ICE VENDORS
Dickinson & Co., F. B. Des Moines, Ia.
Frick Company, Waynesboro, Pa.
Jamison Cold Storage Door Co., Hagerstown, Md.
Refrigeration Engineering Co. Minneapolis, Minn.
S & S Vending Machine Co., San Jose, Calif.
Thermo Cuber Co., Chicago, Ill.
United Ice Supply Co., Boston, Mass.

ICED DISPLAY CASES
(See Display Cases)

INSTANTANEOUS HEATERS
National Pipe Bending Co., New Haven, Conn.

INSULATING MATERIALS
American Hair & Felt Co., Chicago, Ill.
Armstrong Cork Co., Lancaster, Pa.
Cork Import Corp., New York, N. Y.
Mundet Cork Corp., Brooklyn, N. Y.
Pacific Lumber Co., San Francisco, Calif.
Pittsburgh Corning Corp., Pittsburgh, Pa.

LOW TEMPERATURE EQUIPMENT
(See Ice Making and Refrigerating Machinery)

MATERIALS HANDLING EQUIPMENT
Ohio Galvanizing & Mfg. Co., Niles, Ohio
The Mate-Trac Co., Cleveland, Ohio

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WEATHERPROOFED ICE SIGNAL CARDS

Coated Both Sides With Paraffine

ANY COLOR

ANY SIZE

We Make Any Design of Ice Signal Card

Send In Your Individually Designed Cards for Quotation

Write for Ice Signal Card Circular and Prices

Index Coupon & Supply Co.
LaPorte, Indiana

Your Assurance of Best Quality

REFRIGERATION COILS

made by The National

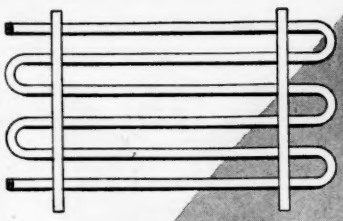
PIPE BENDING COMPANY

All features that you demand are furnished regularly in National Pipe Bending Refrigeration coils—smooth bends, perfect welds, measurements exact.

For long service specify coils by the National

Pipe Bending Co.
Established 1883
162 River St. New Haven Conn.

welded steel pipe coils



Flat
Cylindrical
Box
Raceway
Oval
other types

PROMPT DELIVERY—
COMPETITIVE PRICES

SEND DRAWINGS
AND SPECIFICATIONS
—QUOTATIONS
FURNISHED RETURN MAIL

RECO

REFRIGERATION ENGINEERING CORP.
PRODUCTS DIVISION
2020 Naudain Street, Philadelphia 46, Pa.
Phone: KIngsley 5-3630

SAVE MONEY With The New *Bateman* LOADER CRUSHER

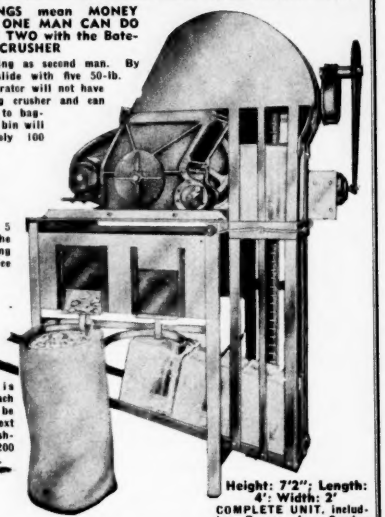
LABOR SAVINGS mean MONEY SAVINGS and ONE MAN CAN DO THE WORK OF TWO with the Bateman LOADER CRUSHER

. . . loader acting as second man. By loading hopper slide with five 50-lb. blocks of ice, operator will not have to bother loading crusher and can devote full time to bagging ice. Storage bin will hold approximately 100 lbs. of ice.

CRUSHER has 5 adjustments on the grate for adjusting to proper size ice desired.

ELEVATOR is timed to allow each block of ice to be crushed before next block enters crusher. Capacity: 200 lbs. per minute.

SCRAP ICE can be put into crusher by opening end of Guide that directs ice from elevator to crusher.



Height: 7'2"; Length: 4'; Width: 2'

COMPLETE UNIT, including Bagger, less Crusher Motor $650.00
Elevator, Bin & Bag Holder, less crusher $437.25
Galvanized ..... add $20.00
Any Bateman Model 50 Crusher can be installed in this unit.

BATEMAN FOUNDRY & MACH. CO.
MINERAL WELLS, TEXAS

THE BUYERS

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MINERAL WOOL
Cork Import Corp., New York, N. Y.

MOTOR TRUCK BODIES
Gifford-Wood Co., Hudson, N. Y.

OIL AND LUBRICANTS
Frick Company, Waynesboro, Pa.
Socony-Vacuum Oil Co., Inc., New York, N. Y.
Sun Oil Co., Philadelphia, Pa.
Texas Co., The, New York, N. Y.

OILS, CUTTING
Socony-Vacuum Oil Co., Inc., New York, N. Y.
Sun Oil Co., Philadelphia, Pa.
Texas Co., The, New York, N. Y.

OIL SEPARATORS
King-Zeero Company, Chicago, Ill.

OILS, FUEL
Socony-Vacuum Oil Co., Inc., New York, N. Y.
Sun Oil Co., Philadelphia, Pa.
Texas Co., The, New York, N. Y.

PACKINGS
Frick Company, Waynesboro, Pa.
Vivian Mfg. Co., St. Louis, Mo.

PALLET TRUCKS (MOTORIZED)
The Moto-Truc Co., Cleveland, Ohio

PIPE COILS AND BENDS
Acme Industries, Inc., Jackson, Mich.
Chicago Nipple Mfg. Co., Chicago, Ill.
Frick Company, Waynesboro, Pa.
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.
National Pipe Bending Co., New Haven, Conn.
Philadelphia Pipe Bending Co., Philadelphia, Pa.
Pittsburgh Pipe Coil & Bending Co., Pittsburgh, Pa.
Rempe Company, Chicago, Ill.
Vogt Machine Co., Henry, Louisville, Ky.

PIPE COVERING
(See Coverings, Pipe and Boiler)

PIPE WELDING
Acme Industries, Inc., Jackson, Mich.
National Pipe Bending Co., New Haven, Conn.
Philadelphia Pipe Bending Co., Philadelphia, Pa.
Pittsburgh Pipe Coil & Bending Co., Pittsburgh, Pa.
Vogt Machine Co., Henry, Louisville, Ky.

PIPING
Acme Industries, Inc., Jackson, Mich.
Byers Co., A. M., Pittsburgh, Pa.
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Martocello & Co., Jos. A., Philadelphia, Pa.
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Philadelphia Pipe Bending Co., Philadelphia, Pa.
Pittsburgh Pipe Coil & Bending Co., Pittsburgh, Pa.
Refrigeration Engineering Corp., Philadelphia, Pa.
Rempe Company, Chicago, Ill.
Vogt Machine Co., Henry, Louisville, Ky.

PISTON RINGS
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Refrigeration Engineering Corp., Philadelphia, Pa.
Roots-Connersville Blower Corp., Connersville, Ind.

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Refrigeration Engineering Corp., Philadelphia, Pa.

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Deming Co., The, Salem, O.
Layne & Bowler, Inc., Memphis, Tenn.
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Roots-Connersville Blower Corp., Connersville, Ind.
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Frick Company, Waynesboro, Pa.
Roots-Connersville Blower Corp., Connersville, Ind.
Vogt Machine Co., Henry, Louisville, Ky.

PUMPS, DEEP WELL
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Layne & Bowler, Inc., Memphis, Tenn.
Worthington Pump and Machinery Corp., Harrison, N. J.

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Refrigeration Engineering Co., Minneapolis, Minn.
S & S Vending Machine Co., San Jose, Calif.

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All classified advertisements are payable in advance. Except for Positions and Help Wanted classifications, this section is reserved exclusively for the purchase and sale of USED equipment, existing and used plants, and surplus material.

POSITIONS AND HELP WANTED

POSITION WANTED—Sales and Service engineer with twenty years experience in commercial and industrial refrigeration applications. Freon and ammonia equipment and insulation. Details gladly furnished; excellent references. Available in 30 days. Address Box AU-3, Ice and Refrigeration, 435 N. Waller Ave., Chicago 44, Ill.

ICE PLANTS—*Wanted and For Sale*

FOR SALE—Ice plant and coal yard in good industrial city of 25,000 in Northeastern Ohio. Excellent opportunity. George P. Samman, 1509 Williamson Bldg., Cleveland 14, Ohio.

FOR SALE—Ideal 20 ton electric ice plant, modern design, four years old; in noncompetitive S. C., town; reasonably priced; good terms. Selling capacity in rapidly expanding section of South Carolina. Immediate possession. Address Box JL-12, Ice and Refrigeration, 435 N. Waller Ave., Chicago 44, Ill.

FOR SALE—Complete 25-28 ton raw water, electric driven ice plant. Built since the war; exclusive territory, no competition; in good Southern town. Business has been increasing each year. This is not a forced sale; owner has good reason for selling. If you are looking for something good, this is it. Address Box AU-16, Ice and Refrigeration, 435 N. Waller Ave., Chicago 44, Ill.

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LARGE ICE PLANT

4 Ingersoll-Rand ammonia compressors, 50, 90 & 100 tons, direct connected to synchronous motors. 1 York 6½ x 6½ h.s. V belt, forced feed lubrication. 1 York 6½ x 6½ slow speed. 3 transformers. 500 ice cans 300#. 2 large brine coolers. Electric cranes. 10,000' - 2" ammonia pipe with return bends, like new. 4 high pressure boilers.

H. LOEB & SON
4643 Lancaster Ave. Philadelphia 31, Penna.

USED MACHINERY—*Wanted and For Sale*

WANTED—Used ice cubing machines and used ice crushers, blowers. UNITED ICE SUPPLY CO., 55 Beverly St., Boston 14, Mass.

FOR SALE—Flynn & Emrich automatic cake ice cuber, reconditioned and insulated cork-lined storage box. Address Box AU-11, Ice and Refrigeration, 435 N. Waller Ave., Chicago 44, Ill.

FOR SALE—1 horizontal, twin cylinder Arctic ammonia compressor. 12" bore 18" stroke, direct driven by 225 h.p. 120 r.p.m. AC synchronous motor. In excellent condition. Homestead Ice Company, Homestead, Pa.

FOR SALE—One 5x5 Frick compressor, medium speed, with V groove fly wheel. One 4½x4½ Baker compressor, high speed. Arthur Brown, Springtown Ice Co., Springtown, Texas.

FOR SALE—One 1948 model Flynn & Emerich automatic ice cuber, type 100, equipped with 3 h.p. motor; 15,000 cubes per hour capacity; used only very slightly last summer. Fairport Storage & Ice Corp., Fairport, New York.

FOR SALE—8x8 Creamery Package ammonia compressor, V-belt drive, equipped with Voss valves, Serial No. 6101, complete with 40 h.p. G.E. motor and Westinghouse magnetic starter. Arden Farms Co., F. C. Cornford, P. O. Box 3067, Seattle, Wash.

WANTED—Crank shaft for Fairbanks-Morse 6 cylinder, 14x17, style VA or Model 32 engine, serial No. 643338 or later. This is 8" shaft at main bearings. Must be perfect shaft never broken or repaired. Address Box AU-8, Ice and Refrigeration, 435 N. Waller Ave., Chicago 44, Ill.

FOR SALE—7x7 Frick high speed compressor complete with 50 h.p. Westinghouse motor and auto-starter. Also pre-cooling coils and tanks. Excellent condition. 1—Mathews impeller type vegetable washer complete; used very little. Gould pumps and gear reductors; write for complete description of washhouse equipment. C. Roy Curtis & Son Inc., Marion, New York.

FOR SALE—Complete 20 ton Arctic Pownall ice making plant with two compressors; 1—each York 9x9, Frick 6x6, York 5x5 self-contained unit; Baker 4½x5 self-contained unit. Two 4 cylinder Lipman 4 ton self-contained units. 150 ton Skinner-Unifio DeLaVergne unit. 1¼"x5" weld return bends. Frick 10x10 crank shaft and pistons. Flywheels. 1 each 150 and 180 h.p. Fairbanks-Morse Diesel engines. 1 each 40 and 60 KVA generators complete. Freezer doors, pipe coils, ammonia fittings; 15 h.p. DC G.E. motor. One 25 h.p. AC G.E. motor. Parke Pettegrew & Son Co., 370 W. Broad St., Columbus 8, Ohio.

USED MACHINERY—*Wanted and For Sale—Cont.*

WANTED—In the market for any good used refrigerating and ice making equipment you may have for sale. Address Box DC-19, Ice and Refrigeration, 435 N. Waller Ave., Chicago 44, Ill.

FOR SALE—One 5x5 high speed self-contained York. 4x4 and 3x3 self-contained Yorks and Fricks. 3x3, 4x4, 5x5, 6x6 and 9x9 Yorks, splash lubrication. One 40 ton Vogt condenser. Two 10 h.p. Freon condensing units. One 15 ton Vilter shell & tube condenser. Write E. Niebling, 1318 St. Clair. Mt. Healthy, Cincinnati 31, Ohio.

FOR SALE—120 h.p. FM Diesel connected to 75 KW generator, complete. Good condition; reasonable. WANTED—One 12½x14½ York ammonia compressor, speed 180 r.p.m., connected to 150 h.p. synchronous motor. 440 volts. Must be in good condition. Address Box AU-18, Ice and Refrigeration, 435 N. Waller Ave., Chicago 44, Ill.

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FOR SALE—Compressors. York 6½x6½, Y-15 with motor, $700.00. York 4x4, $300.00. York 5x5, $400.00. Frick 5x5, $300.00. Baker 8x8 with 40 h.p. motor, shell and tube condenser, complete with sweet water cooler, $1250.00. Ammonia receivers, all sizes, $50.00 each. Two shell and tube condensers for 5x5, $100.00 each. Vilter two ton flake unit, $900.00. 60 ton water tower, complete, $750.00. Blowers, fittings, motors of all sizes. Write us your requirements. Gordon Equipment Co., 6530 W. Jefferson Ave., Detroit 17, Mich.

FOR SALE

7½x7½ Creamery Package ammonia compressor, V-belt drive, 30 h.p. motor, complete with starting switches.
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1—20 ton York ice plant electric driven.
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1—50 ton York ice plant electric driven, herringbone coils, late type.
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1—9"x9" two cylinder Frick ammonia compressor, medium speed.
1—6½"x6½" two cylinder York ammonia compressor, high speed.
1—6"x6" two cylinder Frick ammonia compressor, medium speed.
1—6"x6" two cylinder late model h.s. York compressor.
1—6"x6" two cylinder Voss high speed ammonia compressor.
1—5"x5" two cylinder York high speed ammonia compressor.
2—4"x4" two cylinder York high speed ammonia compressor.
1—3"x3" two cylinder Frick unit, high speed.
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Item No.

1—5x5 York, 200 RPM 16
6—6x6 York's, 200 RPM 20
1—6x6 Frick, 257 RPM 21
2—6½x6½ Arctics, 350 RPM, forced feed lub. 30
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1—8x8 Vertical York, 300 R.P.M. direct connected 327

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10,000 feet wrought Iron pipe—2"—like new 451

Scoring Machines

2—Giffords wood 512

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Item No.

1—15-ton electric driven plant 630
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1—15 Ton Diesel Driven Plant 633
1—35-38 ton New Clear Ice Making Plants 635

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Brine Coolers

1—34x12—96—2—Retubed 801
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2—Stands—Vogt Multi-tube—Each stand 6 pipes high. Each pipe 9"x18" with 7—2" tubes 920
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All Sizes.

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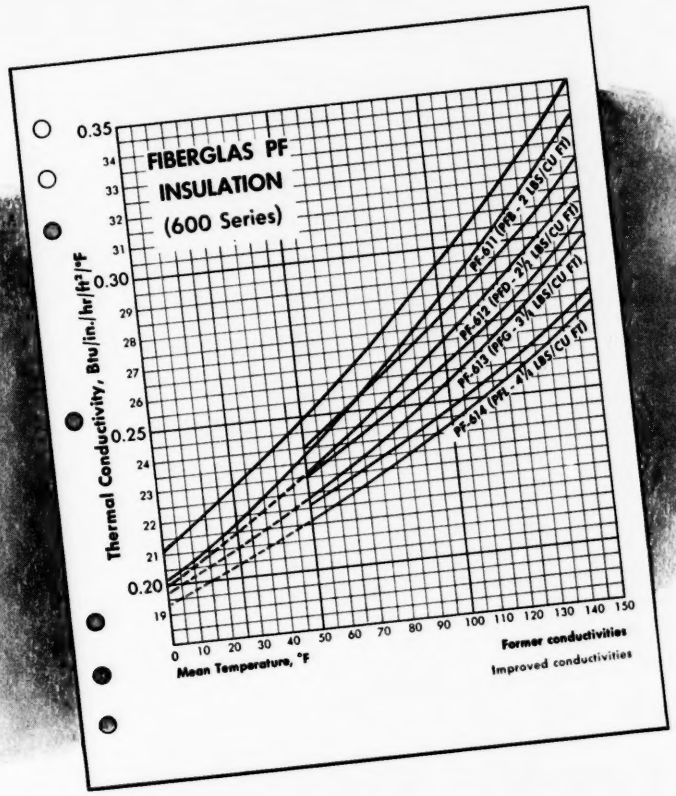

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The conductivity curves shown above in red can mean important savings to manufacturers of refrigerated equipment. They illustrate how conductivities of Fiberglas* have been improved by reducing the diameters of the fine glass fibers which make up this insulating material.

These new, lower conductivities mean that it is possible for many equipment manufacturers to use a lighter density Fiberglas without loss of insulating efficiency. For example, a manufacturer of commercial refrigerators who is now using 2½-lb. density Fiberglas with a K factor of .258 at 75° F. mean temperature can change to less expensive 2-lb. density material with a K factor of .26. This move can result in savings of well over 10% in insulation costs.

If a manufacturer of refrigerated equipment decides not to change to a lighter density Fiberglas, the efficiency of his product will be improved by the added resistance to heat flow of the new Fiberglas insulation. Danger of sweating when equipment is subjected to severe service conditions is greatly reduced.

In addition to its lower conductivity, the new Fiberglas is softer and easier to handle. It provides a tight fit between edges of the insulation and fills insulation space even more completely.

For complete information on improved Fiberglas insulation, call the Armstrong office nearest you or write today to Armstrong Cork Company, 4508 Queen Street, Lancaster, Pennsylvania.

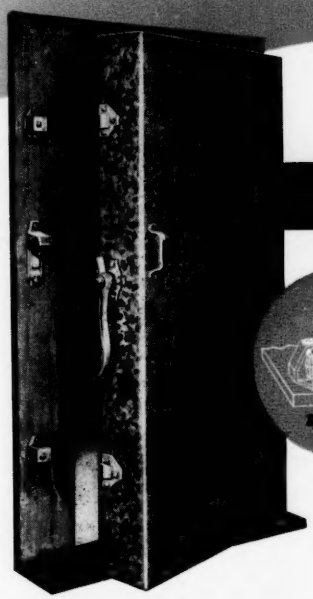
ARMSTRONG'S EQUIPMENT INSULATION

LK CORKBOARD • FIBERGLAS • TEMLOK

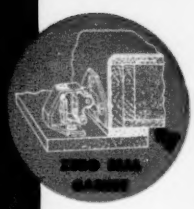
JAMISON-BUILT DOORS

For Use in Zero° F. and Below

TO MEET YOUR SPECIFICATIONS



SUPER FREEZER DOOR

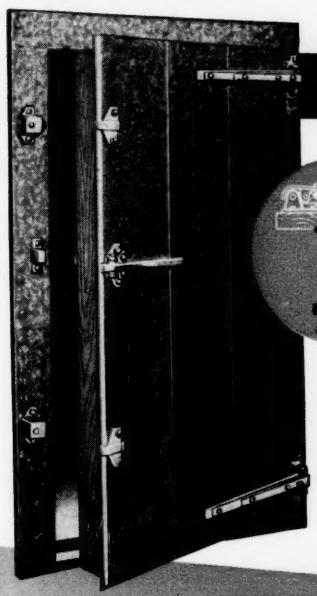


Time Proven Overlap Type

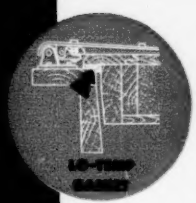
The Super Freezer Door made industrial use of sub-zero temperatures practical. Overlap type of construction permits insulation to any desired thickness. The sealing and insulation efficiency of its 4" wide by 5/8" thick, resilient, moisture impervious gasket is exceptional. The unusually strong hardware of special design, supplied as standard equipment on the Super Freezer Door, is largely responsible for its outstanding performance.

Hinges are: Jamison Adjustable Spring Hinges (Pat. No. 1987512). Fastener: Jamison 031 (single point) Roller Fastener (Pat. No. 2083458).

For only slight additional cost Jamison E-Z-Open (Two-Point) Fastener as illustrated (Pat. No. 2147794) will be furnished. Warm side (Front or Back) of Super Freezer Door is covered with No. 20 gauge galvanized steel forming effective vapor barrier and eliminates possible deterioration due to moisture precipitation.



LO-TEMP DOOR



Infitting Type for Low Temperature Use

A single cellular rubber gasket encased in a moisture impervious skin provides the perfect plug-plus-surface seal. Uniform gasket compression is assured by Jamison E-Z-Open (Two-Point) Fastener (Pat. No. 2147794) in combination with Jamison "Adjustoflex" Hinges, (Pat. No. 2208310). To eliminate possible deterioration due to moisture precipitation the top of door is equipped with a metal cap—front, edges and casing are covered with No. 26 gauge galvanized steel sheet. The Lo-Temp Door satisfies the demand for a door of the infitting type for use in temperatures as low as minus twenty (—20°) Fahr.

Write for the new Jamison Catalog No. 175 that gives full information on these and other types of Jamison Cold Storage Doors.

JAMISON

HAGERSTOWN, MARYLAND, U. S. A.

The Oldest and Largest Builders of Cold Storage Doors in the World